

The Iron Age

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THE IRON AGE

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ESTABLISHED 1855

Semi-Continuous Bar Mill for Alloy Steel

Cooling Equipment Embodies Inclined Escapement and Horizontal Notched Bed Features—Flat Spring Steel Is Self-annealed in Packs

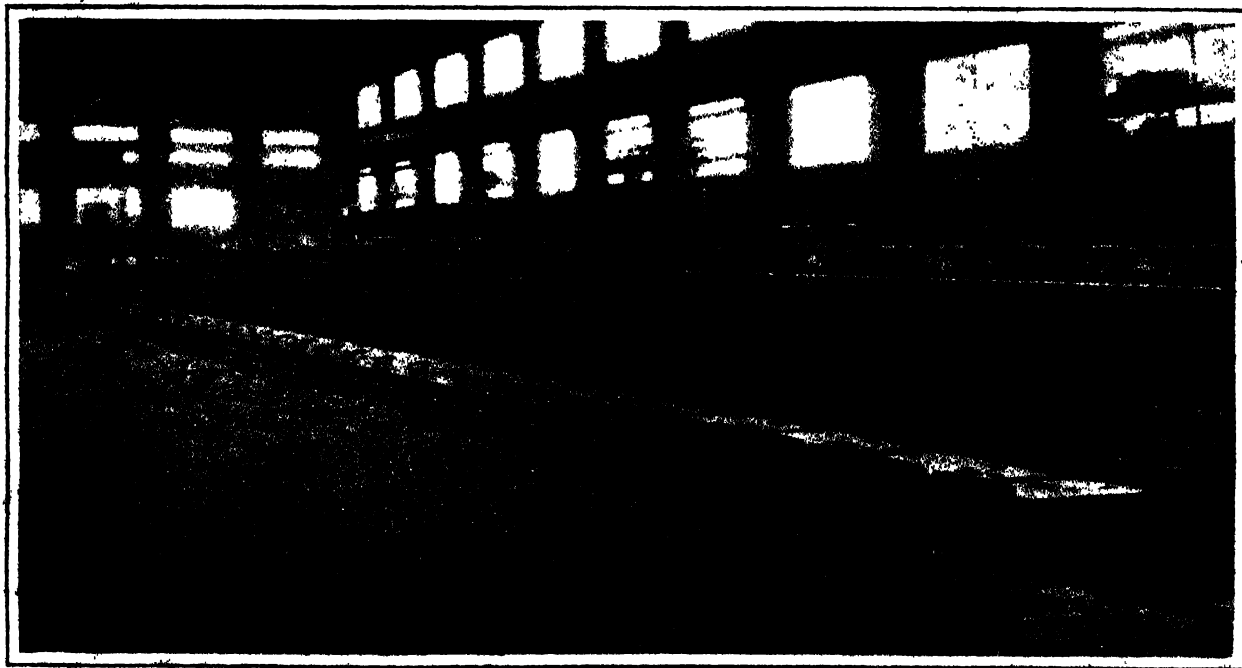
BY F. L. PRENTISS

THE United Alloy Steel Corporation, Canton, Ohio, has recently placed in operation a new 12-in. semi-continuous bar mill, designed and built by the Morgan Construction Co., Worcester, Mass. It is of a special type and includes interesting and novel features to insure the economical production of large outputs of high quality alloy steel products.

The most interesting feature of the installation is the equipment for handling the steel from the time it leaves the finishing rolls until it is cooled and sheared. In modern merchant bar mills, the automatic cooling

eliminate. The problem was put up to the Morgan Construction Co., which incorporated in the cooling bed means for self annealing under temperature control, with neither fuel nor labor costs.

This cooling bed is a combination of two distinct types of bed. The first portion is the well known Edwards inclined escapement bed, which in this case has racks very much shorter than usual. The function of this portion of the bed is to control the bars while they drop from rolling heat to annealing heat. The second portion is a horizontal notched bed capable of

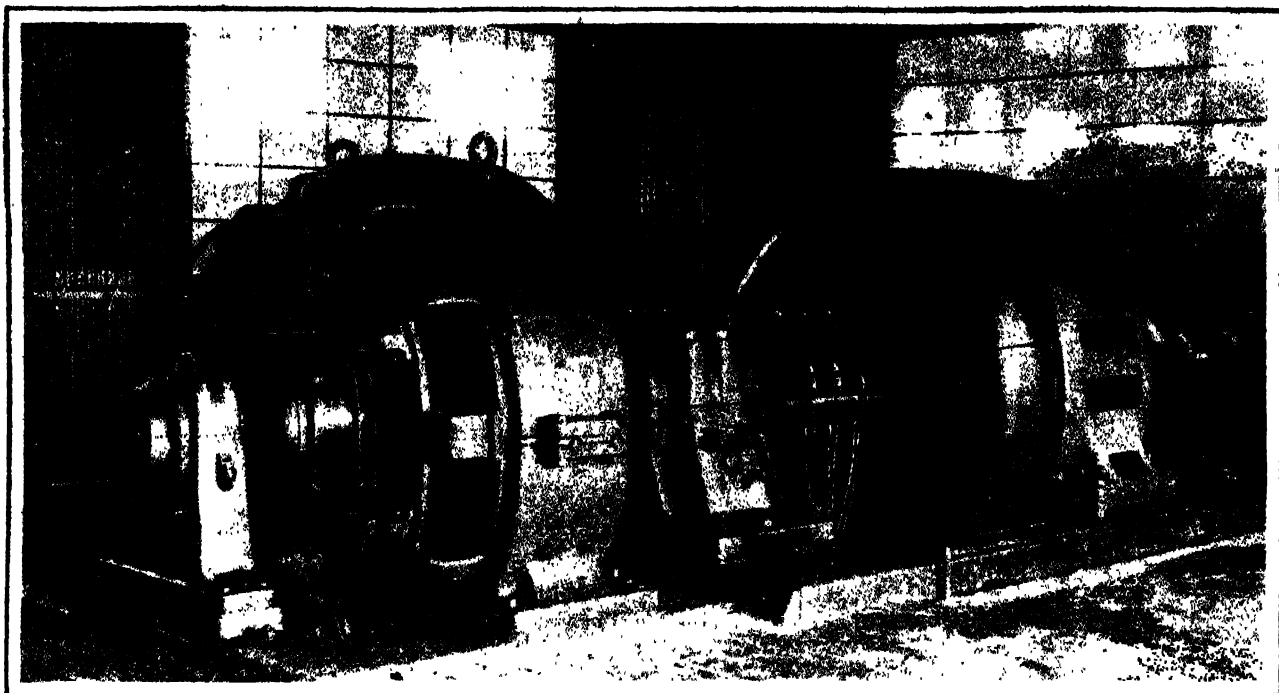


The Cooling Bed is a Combination of the Inclined Escapement Type and the Horizontal Notched Type. Between the two sections is a packing device; flat alloy spring steel being carried in packs across the horizontal section. The product is self-annealed in these slowly cooling packs. The cooling bed is double (the photograph showing only one side) to take care of the large output in case the mill is operating for some time on alloy steel spring flats, and requiring continuous use of the packing device. The magnetic controllers for the auxiliary motors are on balconies along the side wall, a safety first feature.

bed takes up a very large portion of the mill building and, in a way, dwarfs the rolling mill unit proper. In this particular case, the cooling bed is more than ever the predominant feature of the mill, not only because it is a double bed, 240 ft. long, but also because there has been incorporated in this bed means for controlling the physical structure of the rolled product.

The annealing of alloy steel spring flats after rolling is a costly but necessary operation, which the United Alloy Steel Corporation has long sought to

receiving several bars in a single notch. Connecting these two portions of the bed is a mechanism designed to place flat alloy spring steel in an orderly pack in the first notch. Such a pack, having been formed at a high temperature, retains its heat very much longer than a single bar and the necessary self-annealing is thus performed in these slowly cooling packs. The mechanism can handle flats up to 6½ in. wide in packs up to 3 in. to 4 in. high. Each pack is carried as a unit from notch to notch until it is delivered upon



Both the Roughing and Finishing Mills Are Driven by One Motor. This is a 3000-hp adjustable speed induction motor which is provided with a Kramer regulating set for controlling the speed.

electrically-driven shuffle bars which separate the pack and carry the bars to the shear table. The cooling bed is operated by electric motors throughout, these being controlled from a pulpit by an operator having a clear view of the entire bed.

To provide for the large output of this mill, the cooling bed is made double, and the product is delivered to two No. 5 "Q" Morgan bar shears and back shear tables. These shears, with their back shear tables, deliver the cut product into cradles, mounted directly upon 100,000 lb. Fairbanks, Morse & Co. scales. Each shear is equipped with two hand-traversed shear gages. The shears and back shear tables are located in the shipping department of the mill, which is a building of 90-ft. span and 360 ft. in length, at right angles to the main building. This is served by two 10-ton Alliance cranes. Extension of this building is possible should the necessity for more shipping space arise. Three standard gage loading tracks serve the shipping building, and in addition, a narrow gage track connects this building with a heat-treating department.

Steel for the 12-in. mill is made on a 35-in. blooming mill, and after the billets have been inspected carefully and chipped for the removal of surface imperfections, they are transferred to the billet storage building, 80 x 300 ft., which adjoins the mill building. This is covered by a 10-ton Alliance crane which delivers the billets to the furnace charging platforms.

The billets are charged into two Morgan gravity discharge continuous-heating furnaces of the regenerative type with hearths, 34 x 13 ft. They are fired by gas from a battery of eight Morgan producers. This battery of producers also serves the soaking pits of the blooming mill which occupy an adjacent building.

The water-cooled furnace skid pipes extend to within 7 ft. of the discharge end of the furnace where they turn downwards. The remainder of the hearth bottom is of magnesite. On this hearth the cold spots in the billets caused by the water cooled skids disappear.

A new feature of the heating furnaces is the Isley gas regulating valve. This is the first installation of this form of gas regulator. The producers are located



The Finishing Mill Consists of Four 12-in. Stands, of the Staggered Duo Type, Arranged in Two Trains. The mill is equipped with four "Y" reversing skew roller tables which connect the successive passes. These tables are sufficiently long to handle, with any ordinary series of reduction, bars having a finished length of 240 ft.



Sixteen-Inch Vertical Edging Mills Are Used When Rolling Flat Bars. Thereby Greatly Reducing the Number of Slab Sections Required to Cover the Range of Production. Two are shown, one in front of the fifth stand, another following the sixth stand.

fully 100 ft. from the furnace. The gas enters the mill building underground, and passes up through the regulating valves, where its admission to the furnace is manually-controlled by the heater from the furnace platform.

Each furnace is equipped with a single Isley reversing valve, which controls the regeneration of the air. Since the products of combustion flow through the heating furnace in one direction only, the valve is necessarily placed between the furnace and the checker chambers, and must handle on one side the products of combustion at their maximum heat, and on the other, the incoming air at its maximum heat. The valve is similar to the Isley valve commonly used under the less severe conditions of open-hearth practice.

Billets discharged from the heating furnace are carried on a standard billet conveyor to the roughing mill. In the table, in front of the first roughing stand, is an electrically-driven shear for dividing billets in order to produce in the finished section the desired length for the cooling bed.

The roughing mill is a special Morgan semi-continuous mill, consisting of six roughing and four finishing stands. The first two roughing stands have 18-in.

rolls, the last four, 16-in. rolls. The roughing mill is broken up into groups with connecting tables, the arrangement being such that the bar runs free between the first and second, the second and third, and the fourth and fifth stands.

In front of the fifth, and following the sixth roughing stands, are 16-in. vertical edging mills, driven from the cross shafts of the roughing mill. The edging rolls are employed when rolling flats, and by their use the number of slab sections required to cover the range of production is greatly lessened.

The finishing mill consists of four 12-in. stands of the George staggered duo type, the arrangement being two trains of two stands each. The mill is equipped with four "Y" reversing skew roller tables which connect the successive passes. These tables are ample in length to produce, with any ordinary series of reductions, bars having a length of 240 ft. when finished.

The roughing mill is designed to roll its product from billets, 3 in. to 6 in. square, and from slabs, 3 in. to 6 in. wide, and up to 2½ in. thick. The mill uses both billets and slabs up to 11 ft. 6 in. in length.

The usual practice will be to use 4 and 5-in. billets, except when rolling the larger round bars, for which 6-in. billets will be required. The finishing mill can

The Heating Furnaces Are Equipped with Isley Regulating Valves, This Being the First Installation of This Form of Gas Regulator. The gas enters the mill building underground and passes through the regulating valve, its admission to the furnace being manually controlled by a heater from the furnace platform. Each furnace is also equipped with a single Isley reversing valve for controlling the regeneration of the air. The gas regulating valve is shown in the foreground and the reversing valve back of it in front of the discharge end of the furnace.



produce rounds from $\frac{3}{8}$ to $2\frac{1}{2}$ in. in diameter, flats up to $6\frac{1}{2}$ in. wide, and equivalent sections. The expected output is upwards of 10,000 tons per month of alloy and carbon steel.

The mill building is 90 x 680 ft., with a 40 x 100 ft. lean-to for the electrical sub-station. The roof is of the ordinary truss type. Ample window space is provided, steel sash on roller bearings being used throughout. The shipping and billet storage buildings are similar in construction. A railroad track extends part way down one side of the mill building for bringing in rolls and carrying out refuse. The building is served by a 10-ton Alliance crane. The water supply comes from the plant's general water works system. Water from the furnaces and mill is discharged to the sewer through two scale pits.

Both the roughing and finishing mills are driven by the same motor through a line shaft and gears. A set of main gears reduces the speed of the main motor to the desired speed for the main shaft. The driving

unit is a 3000 hp., 3-phase, 60-cycle, 2200-volt, Westinghouse induction motor, having a synchronous speed of 507 r.p.m. The motor is provided with a Kraemer regulating set which gives speed control between 500 and 300 r.p.m.

Electric current is supplied from the main power station, and is stepped down from 11,000 volts to 2200 volts through three 2000 kw. transformers. There are also three 333 kw. transformers which step down the 11,000 volt current to 181 volts for a rotary converter which supplies 250 volt direct current to the auxiliary motors that operate the cranes, mill tables, cooling bed and other equipment. All the motors, converters and transformer equipment were furnished by the Westinghouse Electric & Mfg. Co. All motors have magnetic control, either of the Westinghouse or Cutler-Hammer type. A safety feature in the plant arrangement is the placing of the magnetic controllers for the auxiliary motors on balconies along the side wall, several feet above the floor.

DISMANTLING VESSELS

Naval Officials Investigating as to Best Method of Procedure

WASHINGTON, Jan. 10.—Data are being assembled by naval officials with the aid of private interests, looking to the development of practical plans for the dismantling of vessels which the Navy is offering for sale, and others that will be disposed of according to the terms of the Conference on the Limitation of Armament. The material will be of great value in the event a permanent ship salvaging industry is established. The scrapping of the naval vessels would be an important preliminary to the institution of such an industry.

With the co-operation of publishers of technical papers, acetylene torch interests, and shipbuilders, as well as through its own direct efforts, the Navy Department is obtaining information from England, France and Germany as to the precise methods used in those countries in dismantling war vessels. Accompanying these studies will be photographs and possibly diagrams and charts showing the actual work of beaching, dry docking and scrapping the vessels, and the locations of sites of the work with respect to steel plants consuming the scrap that is removed and cut to size.

After this material is assembled, it is likely that another conference, supplementing the one held recently at the Philadelphia Navy Yard, will be held in Washington and specific discussion made of the entire scrapping program. It is believed on that occasion financiers, acetylene torch people, shipbuilders, and others, will be presented with sufficiently concrete studies of the subject so that they can intelligently make offers to the Navy Department for the purchase of vessels, with more assurance than has been possible heretofore, as to the success of their undertaking, which, being new, is in a state of uncertainty. Investigations by private interests themselves also will aid them in preparing estimates, should they become interested in the matter, and correspondence with the Navy Department indicates that they have been giving the question considerable study and are becoming interested in it.

It is believed that as to the iron and steel manufacturers, the only concern they will have will be as consumers of the scrap to be salvaged, and it remains to be seen whether this will be made available to them at attractive prices, and whether or not the tonnage will be desired, in view of the present unsatisfactory condition of the iron and steel markets.

While it has been stated that England has developed the ship salvaging industry to a greater and more scientific point than any other country, this opinion is not accepted by some who have casually studied the question. On the contrary, they think that Germany leads in this respect and that that country, through its experience in dismantling ships since the armistice has established the industry on a more economic and satis-

factory basis than any other. For this reason as much information as possible is to be obtained from the operations of the industry in Germany.

Another fact which indicates that the work of dismantling ships in Germany has developed to a successful point, at least for that country with its low costs of labor, is that several German firms are showing a keen interest in the proposed dismantling of American ships and have written to the Navy Department attempting to get the contracts for the dismantling of American vessels, which would have to be taken to Germany. These offers, however, are not being given the slightest consideration. At the outset, the Naval officials point out that the proposed plan of limiting the building of war vessels has been a severe blow to the shipyards of the United States, and it is not proposed to add to the difficulties of shipbuilders and workers by letting the work go outside of the United States. Secondly, Naval officials consider it absurd to think that a great industrial country like the United States cannot, if it chooses, develop a ship salvaging industry as efficient in every respect as any other country.

The assembling of information from foreign countries regarding salvaging may delay negotiations for the sale of the various naval vessels on which bids have been asked and which are to be opened on Jan. 16.

Time of No Accidents

"I believe the day is coming when we will have no accidents in industry. You and I may live to see that day," says Charles Close, manager of the Bureau of Safety, Sanitation, and Welfare of the United States Steel Corporation, in *National Safety News*.

"Two years ago I would not have said that," he continued, "but when I think of our Farrell Works, with a normal force of 3000 men, with all the hazards of the steel industry, going two months without a lost time accident, and our Edgar Thompson plant with a normal force of 6000 men going 54 days without an accident, and other remarkable records made by many of our plants, I do not hesitate to say I believe the day is coming when we will have no accidents in industry. And it is not very long ago that old timers were saying no steel mill could ever go a week without an accident.

"But to bring about the time of no accidents we have to develop a new generation of workmen. We must train the child so that he will develop habits of safety. We must do more than show him the safe way of doing things once, twice, or ten times. We must teach him the safe way of doing things every day, so that when he comes into the shop as a workman he will habitually do the safe thing just as his father to-day habitually does the unsafe thing."

The main building of the Pittsburgh Steel Tube Co., Beaver, Pa., was destroyed by fire on the morning of Jan. 1. The building was one story, of brick construction and housed the drawing mill and machine shop.

Light Movement of Lake Superior Ore

Steel Corporation and Others Give Employment to Miners to Prevent Suffering—Moving of Hibbing Involves Great Expense—Interesting Developments

BY DWIGHT E. WOODBRIDGE, E. M.*

THE Lake Superior iron ore trade of the past year has been at low ebb. Not since 1904, when shipments from Lake Superior were slightly under 22,000,000 tons, has there been a season of so small business. This year water shipments have been 22,352,871 tons, in addition to which there are some 425,000 tons all rail, making the gross tonnage from mines of the lake district 22,778,000 tons. Of this 15,555,000 tons were received at Lake Erie, and about 22,000 tons were sent to the St. Louis district for furnaces there. The figures include 52,145 tons shipped from the Canadian mines north of Michipicoten. Total movement of the year is almost precisely 33½ per cent of the business of 1916, the greatest year in the history of the American iron trade.

So much for statistics. They tell their own story.

This naturally has led to much unemployment in the iron region, and for a time the past fall, conditions were rather serious. Business conditions on all the ranges were very bad, collections slow, new buying slight, and a great number of men were without any work at all. To the everlasting credit of the Steel Corporation be it said that it undeviatingly maintained as nearly as possible a constant force and, while it was unable to furnish work to all its men continuously, it did arrange to keep most of them on a part time basis.

Grateful to the Corporation

While a full employment basis would have been about 12,000 men, it has gone into the winter with some 10,000 at work, half time or better. I well remember the time in Birmingham, a few years after the Steel Corporation became interested there, that the business interests of that city wanted to erect a statue in grateful commemoration of the purchase of the Tennessee Coal, Iron & Railroad Co. The business men of northern Minnesota have this winter had borne in upon them, as never before, the reason for that feeling in Birmingham seven or eight years ago. The Steel Corporation has realized the danger of unrest by unemployment, and its moral obligation to humanity and to the district. These same considerations have influenced the Lake Superior managers for several of the other concerns in the mining business and they have strained every nerve to induce their Eastern boards to follow a similar humanitarian policy, and finally with no small degree of success. As a rule these boards have been in no easy position in this matter, for they have appreciated that ore won now can be delivered only at a heavy loss and that the money for operations largely must be borrowed capital; and perhaps they were not fully awake to the needs of the situation until recently. The Hanna and Pickands, Mather and other smaller employers have ordered several mines into commission and the year closes with a far brighter labor outlook than was believed possible a few weeks ago. It is expected that additional mines will resume in January and that alleviation will continue throughout the rest of the winter. The general situation is more drastic than otherwise on account of the condition of the forest products market. Usually this absorbs thousands of men and is exceedingly active during winters; a year ago there were delivered in Duluth alone over one railway, the Duluth & Iron Range, 200 carloads of pulpwood daily for the entire winter; now this business is trifling, as is that of railway posts, poles, ties, etc.

Hanna Mines Resume

During December the Hanna interests resumed full time operations at four Mesabi mines, adding about 500

*Duluth, Minn.

men to the 250 they had been working there. The rate of pay was reduced to a basis of \$2.75 a day, common labor, so that miners are earning about \$3.75. Pickands, Mather & Co. resumed at three mines on the Menominee, and will start others on the Mesabi in January. Yale, Gogebic range, is to open in January with 300 men, full time; the Oliver mines at Ironwood are running full time; the Hanna interests have taken over the former Hayes properties, Ashland and others, and have been paying the 1921 scale, but no doubt will reduce this soon. Ironton is to be on good production soon. Several mines at Crystal Falls are reopened, paying the 1913 scale which, at that point of low living costs, was about \$2.25.

Almost nothing is going on in mining on the Marquette range. The Gwinn district is idle; stock piles are so large in the entire Marquette region that there is little hope of much activity for some time. At Iron River, Crystal Falls, Norway and Vulcan, on the Menominee, things are fair for the times; the Cuyuna is almost in a state of coma; the Vermillion is more busy, relatively, than any of the lake districts, with most of its mines running and a new one under development.

The Most Hopeful Spot

Really, the most hopeful spot in the region is Iron Mountain, where, to a very limited mine employment, is added the Ford body plant and sawmills, and where there are under negotiation two blast furnace projects. The expectation is that the Ford Motor Co. will construct plants at Iron Mountain for the manufacture of all its motor bodies, and a building 900 ft. long is now under way. By rail shipment to Menominee and from there by water to Detroit, these knocked-down bodies can be delivered cheaply. The Ford purchase of the properties of the Michigan Land & Iron Co. gave it an abundance of hard woods for its requirements.

The lower the price of ore and in general the greater the need for economy in operation, the higher is the Minnesota proportion of the total output of the Lake Superior region; last year Minnesota's percentage of the total was 63, this year it is 79.5. Those figures are eloquent as to the activities of the Michigan districts during the year.

European Ores

Just now the situation is complicated by the advent of northern European ores; while it is probable that the present price for Kiiruna ores delivered at Philadelphia, of say 8.5c. per unit of iron, is less than they will bring later, the fact that contracts are being arranged for perhaps 100,000 tons a year at a vessel rate of twenty shillings the ton, Narvik to Philadelphia, is interesting, to say the least. The price of lake ores is much mixed; at a time when prices are still quoted nominally at \$5.55, Mesabi non-bessemer, it is claimed by some buyers that quotations equivalent to \$4.20 are being made. It is further stated, by operators near St. Louis, that they are able to buy lake ores at \$4 delivered. This would not leave much above freights.

The Proposed Merger

Talk of a merger of various independent steel makers, all with more or less ore in the Lake Superior region, has served to call attention to these holdings and to the life of these deposits under normal mining activities as compared with those of the Steel Corporation; also to the vast reserves of the Mesabi Iron Co., soon now to come on the market as finished product of high grade ores. Of the approximately 250,000,000 tons of merchantable iron ore held by the seven steel companies mentioned as entering this merger, Midvale

has most, and Brier Hill least, but curiously enough, the life of these two, based on their annual consuming capacity, is almost the same. It is generally supposed that the ore interests of Pickands, Mather & Co. will be a part of the proposed organization and it is likely that the ore activities of the merger will be directed to a considerable extent by that company's organization; the situation in this respect is somewhat analogous to that of the old Oliver Iron Mining Co. at the time of the organization of the Steel Corporation. The ore organization of the Republic is likely to be a factor also. The mines and ships of Pickands, Mather & Co. will be a valuable adjunct to the properties of the merger. These ships have a seasonal capacity for about 6,000,000 tons of ore, or say 45 per cent of the probable annual requirements. Some of the best ores held by companies expected to enter the merger are on short time leases, and it will be impossible to come anywhere near exhaustion of these mines before the expiration of present leases. The only very important ore tonnage classed as independent to be had in the lake district is that of the Mesabi Iron Co. One effect of the consideration of these facts has been to induce a more active inquiry for mines, and a number of transfers seems to be pending. Furthermore, there has been recent inquiry for undeveloped favorably situated ore lands, and this inquiry and examination has included tracts not commercial but containing large deposits of lean magnetites, capable of concentration, in both Minnesota and western Ontario. While there are no such vast bodies of these ores as that held by the Mesabi Iron Co., there are, nevertheless, deposits of fair grades collectively running into hundreds of millions of tons. That these will come into the market in due course there is scarcely a doubt.

Minnesota Grants Rights

After many years of withdrawal from market, the State of Minnesota is again to grant rights on mining lands, and the first bids for leases will be opened Jan. 9, next. There are a few State owned tracts—less than a dozen, perhaps—that present more or less attractive possibilities for mining. The law differs from that which was repealed some years ago in several particulars: The maximum unit of land to be taken under one permit is now 80 acres; formerly 160. The royalty is on a sliding scale based on assay of ore and beginning at 25c. or less (dry analysis) on which grade the minimum royalty is 12c. a ton, with a 5 per cent cumulative increase in royalty for every 1 per cent increase in grade. Under this an ore assaying 50 per cent (dry) will be charged a minimum royalty of 40.3c., formerly 25c. for all grades. These are minimum royalties, but properties are put up for lease under sealed bids which must not be under the minimums, and are disposed of to the highest bidder. Formerly there were no bids, the first applicant having preference, but if there were synchronous applicants, then these were given opportunity to bid against each other. The sum to be advanced by applicants is now \$250, of which \$50 is with the application for a permit and \$200 is to bind the successful applicant to "carry out in good faith the covenants of the permit." Formerly the total cost of a permit was \$50. In case land desired contains ore of a class suitable for magnetic separation, only the contained magnetite is considered as iron in figuring the assay value.

No doubt there will be many bids for the few tracts worth consideration, most of which probably contain one form or another of concentrating ore.

Many old State leases, all of which were for the period of 50 years, are approaching maturity; and it will be the efforts of lessees to exhaust them in the next 20 years. This will result in the concentration of effort at points where State leases still show large tonnages, notably to the Mesabi Mountain mine of the Oliver company; and will tend to disarrange former schedules elsewhere.

The Removal of Hibbing

Of spectacular engineering or development projects there have been few during the year. Perhaps the most notable of these has been the removal of the village of

Hibbing. This, while begun some time ago, is now practically complete. It is the removal of the most densely populated 40 acres of the business and residence portion of a town of some 12,000 people to a site a couple of miles distant, in order to permit the mining of that 40 acres, which has long been under lease to the Oliver Iron mining Co. A reference to the map will show that this tract, the southwest quarter of the northwest quarter of section 6, township 57, 21, is surrounded on three sides by developed large open pit mines; to the east and north the Sellers, and to the west the Rust, all of the Oliver company. There also is a little ore on the Pillsbury forty to the south. Connecting these mines is a narrow railway cut from Sellers into Mahoning ground. Ore exists clear through from Sellers to Rust and underlies most of the 40 acre tract; and the overburden is light. It is generally supposed that from 35 to 40 million tons exist therein. The Oliver company has been at a very heavy expense to clear the ground for the proposed opening of this new mine; there have been purchased all the building lots on the 40 acres, and the plotting and building of a new town with all its street pavements, sewers, sidewalks, etc., all done on the most modern scale. Old buildings have been moved and repaired for occupancy, and new buildings have been put up under arrangements with the owners that permit them to buy on long term payments at very low interest. As all this building has been done during the high cost period and as much of this work has far overrun estimates, the amount of money invested by the company, either for itself or on contract, has been very large. The municipality itself has erected many extravagant buildings, such as a municipal power and steam distributing plant costing \$1,000,000, a high castle of a school costing more than \$3,000,000, and other structures in proportion. As about 95 per cent of the taxes levied in Hibbing have been against iron ore properties, these foolish extravagances, which the mining companies have been unable to curb until very recently, are being paid for almost entirely by them. The Oliver company does not do things by halves, and its own expense in the new town have been great. The finest hotel north of St. Paul, the best equipped hospital in the State, a considerable mileage of concreted streets and sidewalks, are all evidence of its liberal spirit. The new Hibbing is probably the most elaborate and metropolitan mining town in the world; all for the removal of open pit ore, the tonnage of which is numbered.

Ending Reckless Expenditures

There are evidences that the era of reckless spendings on the part of Mesabi range mining communities is about over. The thing has been going so fast from bad to worse that the companies have finally taken a decided stand against it, and have invoked, not only the power of the State legislature but of the courts as well. The State has passed laws limiting the expenditure of municipalities to a certain maximum per capita, and the courts have enjoined them from the construction of such public improvements as great recreation buildings, unnecessary schools, and the like. Of the total Mesabi range iron on tax rolls some 20 per cent is in Hibbing and some 4 per cent in Buhl. These two municipalities are referred to as they are among the chief offenders against decent economy in municipal operation. The first had an expenditure of \$225 and the other \$557 per inhabitant. The State has passed a law limiting municipal expenditures to \$100 for general purposes and \$60 for school purposes, per inhabitant. This will limit the Hibbing tax expenditure to about \$1,200,000 for running this village of 12,000 persons, and to \$720,000 for its schools, and one would think it should be able to worry along on this. Buhl, with its 1500 people, will have to economize down to about 28 per cent of its former orgies. The courts have stopped many of the contemplated municipal projects, some of which were well under way with a lot of contracts let and in progress, and the general attitude of governing bodies is one of returning sanity. Taxes have become such a burden that they were unbearable; those paid in the year 1921 over the Mesabi range as a whole have been not far from an average

of \$1 a ton on the ore produced this year, though the Mahoning mine stands out as a shining example with a tax against the year's production amounting to more than \$4 a ton. Even with a normal production of ore this mine would be paying about 60c. a ton this year.

State Profit Tax

Last winter the State legislature passed a law placing on iron mines a "profit tax" of 6 per cent based on a supposed net return to the property from its operations. No payments are due under this act until 1922, and what they will amount to is hard to say. It is scarcely conceivable that the mining companies will pay this discriminatory tax without legal opinion as to it, and the general opinion is that the law will be found unconstitutional.

The village of Mountain Iron, whose normal population is about 1200, had a tax collection this year of \$236,000; it is now limited by the courts to an expenditure of \$8,000 per month. This is now the general attitude of the courts, and it is quite evident that they will stand little more of the former reckless extravagance, which was not only a crime against the taxpayers but a crime against society as a whole.

An ambitious project of the early part of the year seems to have been postponed somewhat indefinitely; that is, the purchase of the Port Arthur blast furnace of the Atikokan Iron Co. and the development of the Gunflint district of the Mesabi. This was undertaken by a Chicago syndicate which spent considerable money only to find the plan impracticable for the present. No doubt there is a large amount of ore in the Gunflint, most of which is of the same type as that held by the Mesabi Iron Co., but the cost of concentrating works big enough to be commercial is very great. Other reasons also probably have led to a temporary abandonment of the project.

Proposed Blast Furnaces

Two undertakings for erection of charcoal blast furnaces at Iron Mountain, Menominee range, are in progress. The first of these, that of the West Chapin Mines Co., has begun construction and has financed itself to the extent of some \$600,000. This proposes to utilize the ores of the West Chapin, silicious hematites running about 40 per cent iron. Its plant is going in at the mines, to the west of the town. The other, under the direction of M. E. Richards, has not yet completed its financing, but is confident of doing so shortly; it expects to take advantage of various ores, more especially of a high lime deposit near Quinnesec. Both are to be of 100 tons capacity, and both will utilize, in part, waste wood products from the Ford mills and another large hardwood sawmill in Iron Mountain.

Imperial mine at Michigamme, belonging to the Ford Motor Co. interests, is in process of rehabilitation for production during 1922. There are a million or two tons of high moisture ore assaying about 46 per cent iron, and in the old days when operated by the Cleveland-Cliffs Iron Co., the property usually showed a loss. But there was a royalty which does not exist now.

Oglebay, Norton & Co. Operations.

Oglebay, Norton & Co., are sinking a 2000-ft. working shaft at their Montreal mine, western Gogebic, and it is now down to ledge. The Republic Iron & Steel Co. is extending its operations in the same region, taking additional properties and planning larger developments. Sunday Lake shaft is to be concreted and much additional work done there by Pickands, Mather & Co. During the year, the McKinney Steel Co. started its completed electrification at Ironton mine. The hoist is the largest d. c. motor-driven iron ore hoist in America, having a capacity for 210 tons per hr. from a depth of 8000 ft., at a speed of 2500 ft. per minute. The shaft at present is 1500 ft. deep, is vertical, of four compartments, with steel timbering to the bottom, and is concreted from surface to ledge, at 90 ft. Hoists, motors and auxiliary machinery are housed in a steel and brick structure that was erected last winter when the average temperature was 6 deg. above zero, and when there was an extreme low of 37 deg. below. The entire installation is very complete and presages

a far greater development at both Ironton and Colby mines than has ever yet been undertaken there.

Some development is under way on the Mesabi, the chief of which is the stripping of Prindle mine, section 2r, 57, 22, by the Oliver Iron Mining Co. A total of 2,000,000 yards will be moved, exposing some 3,000,000 tons of ore. This is at the village of Kewatin, close to the Sargent, St. Paul and Bennett mines.

At the east end of Vermillion Lake, Vermillion range, the Chippewa Mining Co. is developing its Armstrong Bay mine; the company anticipates shipping 100,000 tons in 1922. Its ore is a typical Vermillion.

Called to South Manchuria

During the summer, a group of Minnesota engineers and geologists were called to South Manchuria by the South Manchurian Railway, to examine low grade iron and large coal deposits. It seems that there are vast tonnages of ore, low in grade, but large part magnetic, situated along the line of the railway, and close to the same company's two blast furnaces at Aushan. The duty of these engineers was to see if these ores might be made treatable by magnetic separation, which they seem to be, although the proportion of hematite in the ore forbids a clean separation. Mining now is by hand on high-grade only, and the work is merely the following of seams that are good enough to use. It is generally understood that if the Japanese retain their Manchurian control, these properties will be developed under the management of Americans.

The Great Northern railway is to build a steel and concrete ore shipping pier to take the place of its No. 2, at Allouez Bay, Superior, at an estimated cost of \$3,000,000. Work began in December, and the pier will be ready for the business of 1923. It will be 2100 ft. long, besides approach, and will have 350 pockets, and a probable capacity for storage of 175,000 tons of ore. No. 2, now being razed, has capacity for 105,000 tons.

The Largest Producers

Shipments for the year by the five largest producers in the Lake Superior country have been as follows:

	Minnesota	Michigan	Total
Oliver Iron Mining Co.	11,700,000	2,144,000	13,844,000
Pickands, Mather & Co.	626,500	968,000	1,694,500
M. A. Hanna interests	1,119,000	232,000	1,351,000
Cleveland-Cliffs Iron Co. ...	320,000	667,000	987,000

Decrease in Movement of Raw Products

WASHINGTON, Jan. 10.—The sharp decline in the transportation movement of raw products used by the steel industry and of its manufactured materials for the quarter ending Sept. 30, 1921, compared with the same period of last year, is shown by the regular quarterly statistical summary of the Interstate Commerce Commission made public last Friday, dealing with commodities moving over Class I roads, or those having annual operating revenues above \$1,000,000.

For the entire United States the tonnage of soft coal, coke, iron ore, pig iron and blooms, rails and fastenings, bars, sheets, structural iron and pipe, the shipments on originating roads for the quarter ending Sept. 30 of the current year aggregated 1,860,663 net tons, as compared with 3,302,625 tons for the same quarter of 1920, amounting to a decline of 43 per cent. The grand total of all traffic on originating lines was 7,056,597 carloads for the third quarter of this year and 9,571,611 carloads for the same quarter of 1920.

The figures by products consumed and manufactured by the iron and steel industry follow:

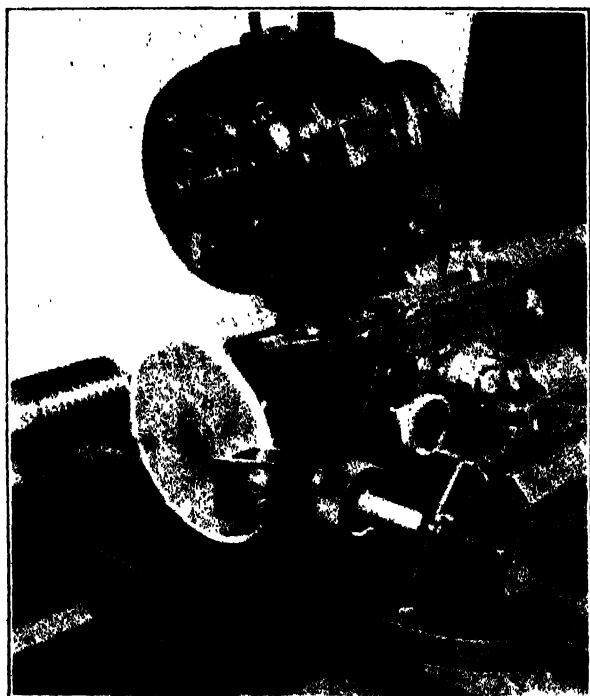
Carloads of Freight Hauled on Originating Railroads—United States

	Quarter Ending—	
	Sept. 30, 1921	Sept. 30, 1920
Bituminous coal	1,402,003	2,057,197
Coke	49,137	196,707
Iron ore	233,683	723,246
Pig iron and blooms	24,014	94,669
Rails and fastenings	13,040	30,775
Bars, sheets, structural and pipe	88,786	210,031
Total carloads	1,860,663	3,302,625

Auxiliary Grinding Wheel Truing Attachment

The Precision & Thread Grinder Mfg. Co., Philadelphia, has placed on the market an improved permanent alignment wheel truing head, shown in the accompanying illustration. It is for use on the company's multigraduated precision thread grinder, but can also be used as an auxiliary wheel truing head on any grinding machine.

The device is intended to keep the wheel always in correct alignment with the lead of the thread being ground. It dresses the V-form on the wheel to a sharper point, facilitating the grinding of much finer pitch threads than usually practicable. There is said to be no limit to the length of thread which may be accurately ground, as the grinding wheel may be trued while grinding. The in-feed for the head is graduated



Permanent Alignment Wheel Truing Head. The diamonds are traversed by operating the double-ended handle on the extended threaded shaft

in 0.001 in. which enables the attachment to be fed-in the same amount as the wheel diameter is reduced by wear and dressing.

The form dressed on the wheel is always in line with the axis of the work centers, as the diamond holder head is graduated in degrees corresponding to the spindle graduation on the grinder proper. The diamonds are traversed by operating the double-ended handle on the extended threaded shaft. They do not cut the wheel simultaneously but in progressive order.

A feature of the attachment lies in the self-sharpening position of the diamonds. They are positioned at an angle of 10 deg. and after slight wear can be rotated a fraction of a turn to present a new point to the wheel. This can be continued until the diamond is worn down to its setting. A stop provided for regulating the return traverse of the two diamonds can be utilized for pre-determining the amount of flat desired at the bottom of the thread angle, thus assuring the same amount of flat regardless of re-dressings and without subsequent re-gaging.

New Combination Drill and Valve Grinder

Following a series of tests by outside interests extending over a period of two years, the Rivett Lathe & Grinder Co., Brighton, Boston, is manufacturing and selling for the Worcester Electric Tool Corporation a combination drill and valve grinder, known as the HusKee combination. The tool has a drilling capacity guaranteed up to $\frac{3}{8}$ -in. in tool steel, although in careful

hands holes up to $\frac{1}{2}$ -in. can be drilled in tool steel and $\frac{1}{4}$ -in. in soft metal. Is specially designed for service station, garage and repair shop work.

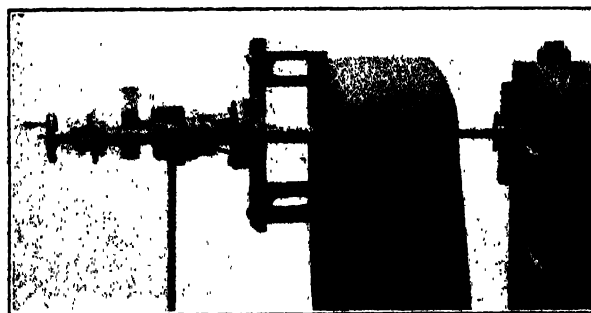
It has a spade handle, which accommodates the largest hand and enables the operator to use the tool as a breast or shoulder drill; the side handle carries the switch, while a heavy head protects the switch buttons. This handle, flattened on two sides and internally reinforced, is designed to be held in a vise. The tool combines the oscillating motion of the valve grinder and the rotary motion of the drill. To change from a drill to a valve grinder it is only necessary to unscrew the drill chuck and slip on the valve grinding sleeve. The tool can be plugged in on any ordinary lamp socket. With the valve grinding attachment it weighs 10½ lbs., and with the drill chuck, 11 lb.

New Portable Boring Unit

A new boring unit based largely on the principles of the portable boring bar and similar in several features to the unit described in THE IRON AGE of Nov. 24, 1921, has been placed on the market by the Pedrick Tool & Machine Co., Philadelphia.

The appliance is shown in the accompanying illustration set up for boring the bearings in a large housing, an extension bar being used. It will drill and feed an auxiliary bar 20 ft. long, and operate either horizontally or vertically. It is claimed that, erected on an angle plate in the shop or attached to bridge members 100 ft. in the air, it will start a hole through a blank surface and bore it out to a size up to the range of any machine with the same spindle diameter.

The four members composing it are the bar, the feed, the driving gearing and the crosshead mechanism. The bar is a steel forging having a square-threaded feed screw embedded in a groove almost the full length of the bar. A 3-in. diameter bar is 3 ft. long and affords 18 in. of travel. The lower end of the bar is bored taper to hold other tools. The feed case is at-



Portable Boring Unit Set Up for Boring in Line the Bearings in Large Housings. The device can be used either horizontally or vertically

tached to the other end of the bar and by blocking the handwheel, becomes automatic in action. Two changes of feed are regularly provided and are operated by movement of a slip pin. If required, however, the unit can be equipped with a three-change feed case. The driving gearing is in compound ratio. Power may be applied to the primary pinion by belt, air drill, electric motor, or by hand.

The crosshead supports and guides the bar, and space blocks provide room between the work and the end of the bar. The crosshead has been designed to facilitate accurate and convenient centering of the bar. When the crosshead has been set up roughly central with the work, four radially-disposed set screws, projecting internally against a bearing, permit shifting the bar to its final alinement. Four bolts on the top of the bearing plate are then tightened and the whole firmly secured.

The Joel M. Stearns Co., Greenfield, Mass., with a capital of \$75,000, has been given a charter to deal in iron, steel, builders' hardware, etc. Joel M. Stearns, Greenfield, is president.

INGOT REHEATING FURNACE

New Design to Avoid Imperfect and Unequal Heating by Proper Control of Incoming Gases

BY H. E. SMYTHE*

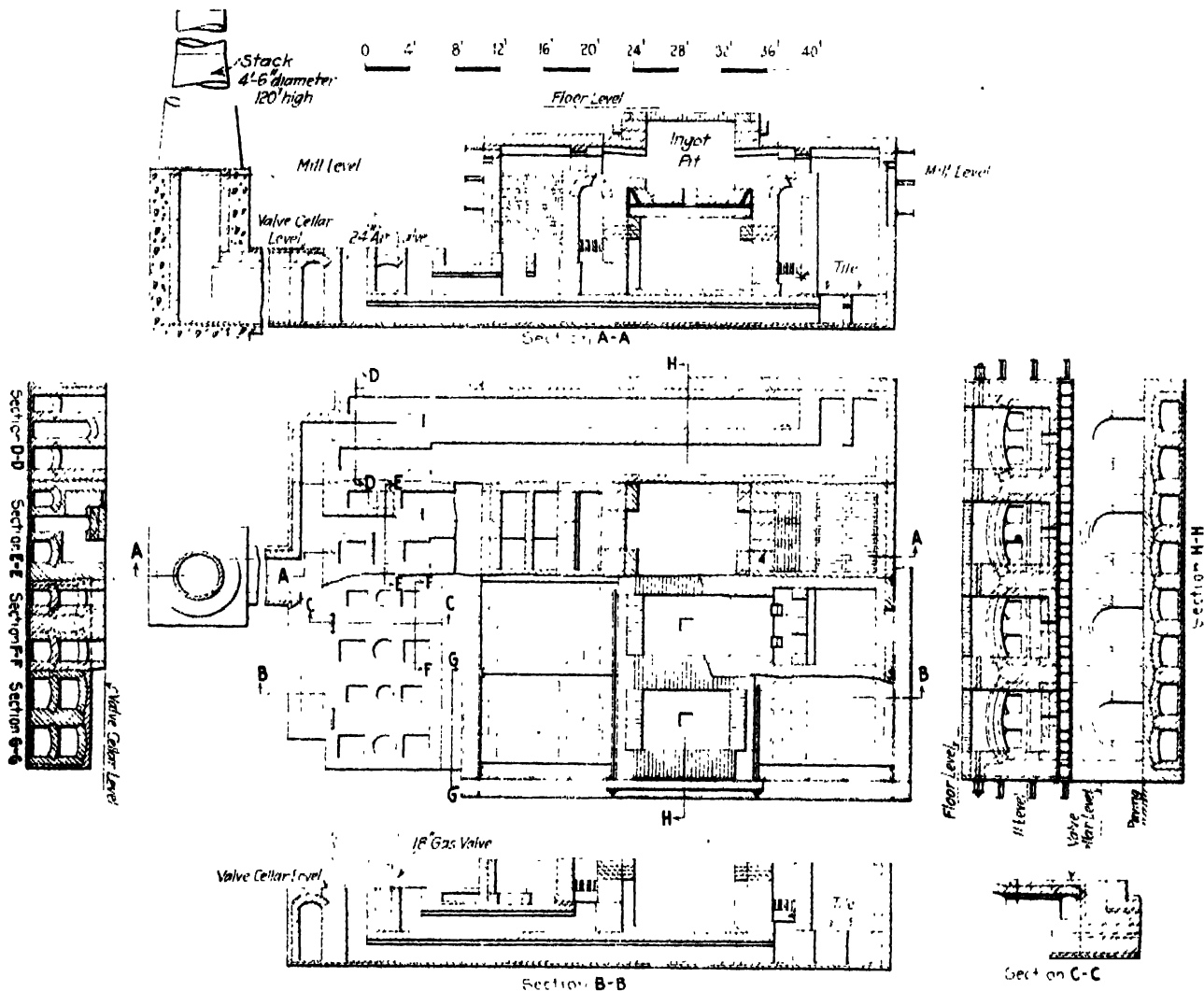
Improper and uncontrolled reheating of ingots, no matter whether they are charged hot or cold into the typical or standard soaking pit furnaces, for the reheating before being delivered to the blooming mill for rolling into blooms, billets or slabs, or to the universal or plate mill for rolling direct into finished plates, has for years been a bone of contention, comment, unfavorable criticism and misunderstanding between the open-hearth operatives producing the steel, and the soaking pit and blooming mill operatives heating and rolling the steel into semi-finished or finished products, all of which contention is to a large degree unnecessary.

After many years of study and experience, both in

after completing the rolling process. The reasons or causes for the majority of these maladies or troubles are improper combustion, lack of heating control and poor mixture of the gas and air before entering the pits.

The drawings show that producer gas is not regenerated; nor is coke oven gas or natural gas. These gases are introduced through slots or ports in which no checkers are placed. When producer gas is used, the reversing valves simply act as a means of diverting it from one side of each soaking pit to the other, and have no connection with the flue leading to the stack, thereby preventing leakage thereto.

All the waste gases leaving the soaking pits pass through the air regenerators only, which are increased somewhat in volume. Therefore, the air is pre-heated to the highest point of efficiency and is introduced through one or more ports or openings, directly over the incoming non-regenerated producer gas, at a point from 4 to 5 ft. before the admixture of the gas and air,



Horizontal, Longitudinal and Transverse Sections of Reheating Furnace, Showing Passages Traversed by Gas and Air

building and operating soaking pits, conclusions have been arrived at which warrant the statement that at least an average of 85 to 90 per cent ingot yield from open-hearth practice can be assured, and considered as good grade and marketable steel. In our judgment, the real trouble commences when the ingots are introduced into the soaking pits, through imperfect and uncontrolled reheating, whereby the ingots are subjected to hot gas and air pockets, streaks, waves of flame, which burn, cut or blemish different parts of the ingot, without properly or uniformly reheating or soaking the ingot at top, bottom and through to center. This causes a heavy jacket or scale formation around the ingot, which means excessive oxidation, honeycombed, pitted, scabby and spongy surfaces, and these blemishes eventually find a permanent position within the steel

or combustion point, thereby assuring a uniform heat, clear flame and proper combustion. This is non-oxidizing, all of the gases being properly consumed within the pits, which is the proper place, and not passing through the checkers out to the stack, which is now the prevailing condition.

When using coke-oven gas or natural gas, the gas pipes are introduced through the sides of the pits directly under the bottom, into the gas slots, which have no connection with the stack. The gases pass up to the gas ports, where they come in contact with the pre-heated air introduced directly over them.

In this construction and type of soaking pit, the products of combustion are laid directly down and upon the soaking pit bottoms, thereby making it possible more easily to remove the cinder. Another feature is the fact that, where coke breeze is used in making bottoms for soaking pits, in ordinary and usual practice,

*President, S. R. Smythe Co., Pittsburgh.

the bottoms chill to such an extent that a considerable amount or quantity adheres and freezes to the ingot bottoms, and is withdrawn with each ingot, especially when cold ingots are charged, which is quite an expense and nuisance. This type of soaking pit eliminates these conditions materially.

Letters patent have been secured upon the improved soaking pit furnaces here described, several of them have been built and are in operation, and the results speak for themselves. Any existing pit furnace can be changed to this principle. The same principle is applicable to other types of furnaces, and for reheating the semi-finished billets, blooms and sheet bars to produce their various finished products.

Very little attention or study has hitherto been

given to improving the method for reheating steel in its various forms and stages of production, and it can safely and conservatively be said that at least from 50 to 60 per cent of the troubles and imperfections known to us and to the steel producer are not from making of steel or ingots, altogether, but from imperfect and improper treatment and reheating.

The features above referred to are materially improved in this type of soaking pit furnace, and it can be shown and proved that uniform reheating and high efficiency are obtained with a minimum fuel consumption, maintenance, consumption of bottom material, loss by oxidation, practically smokeless stacks, and furthermore, the blooms, sheet bars and plates have homogeneous, smooth and clean edges and surfaces.

Automatic Double-Spindle Disk Grinders

The Gardner Machine Co., Beloit, Wis., has brought out an automatic double grinder, designated the No. 1, intended for the rapid grinding of two opposite sides of a piece simultaneously.

Parts which are particularly adapted to this type of grinding machine are piston rings, ball and roller bearing races, sad-iron sole plates, thrust washers, gear blanks and other similar pieces. The new machine, which is designed for greater production than possible with the hand-operated type, is automatic in operation and of the continuous feed type. It differs in several features from the ordinary double-spindle disk grinder and is intended to permit of much greater accuracy.

The spindles are parallel and placed in an off-set relation, as shown in the illustration. When the grind-

Adjustment of the grinding members is by means of a hand wheel operating through a worm gear and screw. The hand wheel is graduated in 0.0001 in., to permit of extremely close adjustment. Truing devices are provided for dressing the faces of the cutting members and this, with the provision for accurately aligning the spindles of the machine, enables a high degree of accuracy to be obtained. Each grinding member is supported by the entire head. The thrust is carried by hardened and ground steel collars which bear directly upon the spindle bearings. In advancing to the work the entire head slides upon ways.

The automatic feeding device, shown in the illustration, is used to keep the work carrier loaded when the machine is in operation on work which permits of the higher rates of feed. When the larger work, requiring the lower feeding rates is being ground, the carrier is said to be fed more economically by hand.

The truing devices are an integral part of the machine and are ready for use at all times. Dressing does not interfere with the set-up, nor is it necessary to stop the machine to use the dressers. The spindles are of alloy steel, heat treated, and are mounted in bronze bearings of special design, adjustable for wear. Sliding surfaces are wide and the ways protected with shields to exclude dust and dirt. Sliding parts are amply lubricated and are provided with gibs to take up wear.

Rates Declared Unfair

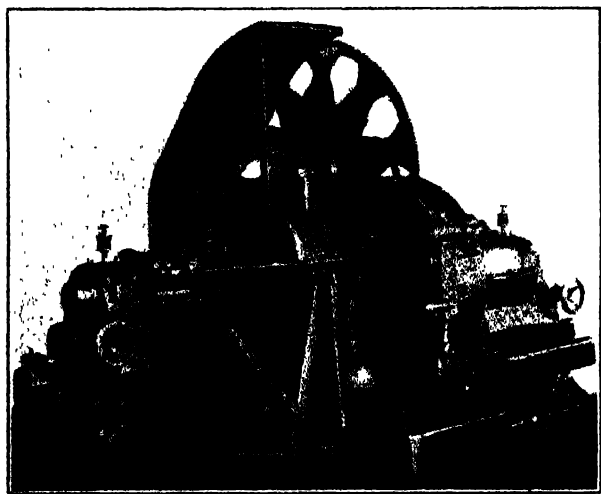
WASHINGTON, Jan. 10.—Complaint has been filed with the Interstate Commerce Commission by the Parkersburg Rig & Reel Co., alleging that rates on fabricated and unfabricated plates and sheets, 12 to 16-gage, in straight or mixed carloads, with structural and other steel products named, including nuts, bolts, castings, and rods, applying from Parkersburg, W. Va., to eastern defined territories to all points in California, are unreasonable.

It is charged that they are excessive to the extent that these rates exceed the commodity rates on plates and sheets, 11-gage and heavier, which take less than the fifth class rate, while the latter is the rate applying to plates and sheets, 12 to 16-gage.

The complainant alleges that the rates charged are discriminatory in favor of shippers who fabricate plates 11-gage and heavier in the Mahoning and Shenango valleys, the Pittsburgh district, Kansas City, Mo.—Kans., St. Louis, Chicago, Denver, and other points.

In association with the National Research Council and other scientific and technical bodies, the Bureau of Standards is interested in formulating a program on a comprehensive scale for the study of the fundamental phenomena relating to corrosion. A steering committee has been appointed, and it is expected that investigation of this difficult subject will be encouraged in several centers, according to a definite plan to be decided upon.

The Black & Decker Mfg. Co., builder of portable electric tools, announces that effective Jan. 3, it will make a freight allowance on shipments of 100 lb. or over to points in the United States and Canada.



By Means of Metal Inserts, Openings in the Work Carrier May Be Made to Conform to Hold Work of Various Shapes

ing requires the use of coolant, the grinding members consist of 24-in. diameter abrasive ring wheels carried in special chucks. For dry grinding 24-in. steel disk wheels, faced with the company's improved abrasive disks, are used.

The work is carried to the grinding position by a work carrier which passes between the grinding members. The carrier has a range of feeds from 6 to 40 pieces per min., which is intended to accommodate a variety of work, from pieces with a large surface requiring the removal of considerable stock, to those of small areas requiring a light cut. The work carrier is provided with either 5 or 10 openings, to receive the work. As the work approaches the grinding position, one of the grinding members automatically advances, until it reaches a positive stop. This member approaches the work under an adjustable spring pressure, and consequently advances only as rapidly as the stock is removed, giving a constant pressure to the work being ground. It is returned to the open position by the action of a cam, and the work, as it passes out from between the wheels, is unloaded automatically. The cam also acts to govern the spring pressure feed.

Production and Yield of Rolling Mills

Dependence of Material Yield on Oxidation and on Bloom and Billet Cropping—Temperature Limitations Govern Reheating

BY JOSEPH F. SHADGEN

(Continued from page 46, Jan. 5)

OF the greatest importance is the fact, well recognized to-day, that the ratio of operation has the large influence on determining the power demand per unit rolled, as a mill running light takes 50 per cent of the current required for full operation. This can be checked up on the chart of any registering wattmeter, and explains the basis of the efficiency of continuous mills, and incidentally a leading reason for their adoption. It follows logically that by all means a mill should be operated at full capacity, and it is logical, because it is more economical to provide two 8-hr. shifts working 90 per cent than it is to have three 8-hr. shifts working 60 per cent. The present low load factor is of course one of the main reasons for present high production costs.

The author wishes, in concluding this division of the subject, to give credit to numerous sources (proceedings Association of Iron and Steel Electrical Engineers, *Revue de Metallurgie*, *Stahl und Eisen*, *THE IRON AGE*, etc.), out of which part of the underlying data of the above compilations were compiled.

Material Yield

The rolling process entails a certain loss of material that, as suggested, is an important item of the operating cost. The yield of a mill is usually expressed as a percentage of the weight of the material fed into the rolls. To say the yield of a blooming mill is 91 per cent means that, of 100,000 lb. of ingots, finished blooms weighing 91,000 lb. are produced; or, in other words, to secure 100,000 lb. of blooms requires the supply of 109,890 lb. of ingots.

Reasons for loss of material in the rolling process are (a) the oxidation loss in the furnace and mill, and (b) the loss through rolling, including a loss due to the quality of the material.

Losses due to heating, while partly inevitable, should be kept low by close supervision of the furnaces. The amount of steel oxidized is a function of the flame control of the heating device, the length of exposure to the heat and the weight of the ingot or bloom. If the flame or hot gases that supply the heat are of a reducing nature, the loss is naturally smaller than if they carry a surplus of oxygen attacking the metal. Hence the first requisite is to devise proper flame control, and this need explains the present tendency to use gas-fired furnaces, and the vogue of pulverized fuel utilization, permitting easy and instantaneous changes in the condition of the flame.

That the time of exposure influences oxidation is obvious because, the longer the steel is in contact with the gases and the furnace bottom, the greater are the chances of producing scale and slagging. The weight of the material is of importance insofar as it usually fixes the ratio of exposed surface to the total volume of metal, and because the interior has to be heated thoroughly to avoid unexpected rolling resistance and possibly breakage of the mill. It follows that the time of exposure is usually a function of the cross section of the material to be heated, but the bringing to temperature should be done as quickly as compatible with the nature of the steel.

The limit of temperature is governed also by the

quality of the material (1200 to 1300 deg. C., or 2200 to 2375 deg. Fahr., for soft steel and 950 to 1050 deg. C., or 1750 to 1925 deg. Fahr., for high-carbon steels, etc.). If the steel is fed hot to the furnace, as for instance in the form of freshly stripped ingots, the time of heating is considerably reduced. The loss due to scaling varies from $\frac{1}{2}$ per cent of the weight up to 3 or 4 per cent, and should never exceed 4 per cent.

The blooming mill loss is usually small, because the pit furnaces receive hot stock directly into the cast house, the time in the furnaces varying from 1 to 2 hr. according to the size of the ingot. In Europe in non-heated pits it is customary to figure on a 1-per cent scale loss, and in heated furnaces on 2 to 2½ per cent; in the United States 2½ to 3 per cent is a fair average. For all ingots above 14 in. square in cross section. If cold ingots are to be reheated, the soaking time varies from 2 to 3 hr. and the loss in weight averages 3½ per cent.

Blooms and billets are heated relatively quickly. If put into the furnace hot direct from the bloom or billet shear, 1½ per cent scale is good performance, while for cold stock 2½ to 3 per cent is the average. For slabs 3 per cent is a fair figure, because they are bulky and lie flat on the hearth, thus exposed to the slug forming action of the bottom. Continuous furnaces of the pusher type should give better results than the side door furnaces. In Europe furnace builders often guarantee a definite maximum loss to back up their claim of superior regulation of their construction.

Rolling Losses

Losses through the rolling operation consist in the inevitable cropping of ends, cobble accidents in handling the material in and out of the rolls, cold spots, etc. The lengths of the charged sections are figured to yield definite lengths of finished product plus a small safety factor, usually 2 to 3 per cent, to avoid short lengths. In small mills, where material loops from one pass into another, the accidents create that amount of scrap, entailing additional loss. While in a blooming mill or a rail mill 3 to 5 per cent total loss is normal, on bar mills it commonly reaches 5 to 8 per cent, and on wire mills, 7 to 10 per cent. In plate mills and sheet mills the losses are correspondingly larger, because the finished product has to be cut to size in two dimensions, length and width. The average loss is 15 to 25 per cent, though for universal plate mills 8 to 15 per cent is good practice. Inspection influences the yield, and much depends on the interpretation of specifications and the rigidity of their application.

The third influence creating a loss of material in rolling mills is the quality of the ingots. This has to be dealt with separately, because of its importance from a tonnage standpoint, and because it should not be charged as a factor of blooming mill performance. In large plants the loss due to quality affects primarily the blooming mill, but is, in a measure, beyond the control of the rolling operatives and, as suggested, should be regarded as a separate item. If the ingots are sound, the crop ends at the shear are normal, but if the ingots are infected by blowholes, piping, segregation and other ills, the loss at the bloom shear increases

rapidly, and amounts often to 12 to 15 per cent as a year's average. This means that no less than one-seventh of the ingots cast are rolled to become scrap, or that one-seventh of the heat, power and labor of rolling are spent for nothing, a direct loss and an undeniable waste.

It follows that the material yield is a pretty accurate and severe measure of the quality-performance of the steel-plant that supplies the ingots. While in Europe a 90 per cent total yield of the blooming mill (scale loss 1½ per cent; crop ends 8½ per cent) is considered the average loss, and while many well-managed plants average 8 to 9 per cent over some years of operation, here in the United States it is not uncommon to find an average between 12 and 15 per cent, showing conclusively that there are opportunities for improvements. Experts like De Loisy, in close touch with the achievements in France, figure on only 3½ to 5 per cent loss for cropping (total loss about 7 per cent), and in Germany a number of plants show 8 per cent as the total loss, or a yield of 92 per cent, over years of operation.

It has been conclusively demonstrated that large ingot sections increase the bloom shear loss, and today, with accurate ways of measuring all factors in-

loss produces furnace slag, and the roll mill loss furnishes scale, both of which can be sold, and the crop ends have a value as scrap. This should be credited to the cost of production.

If the power factor per ton of finished product is desired, the data already given must be multiplied by the yield of each mill. Tables II and III give the net operating cost of various products for a pre-war year;

Table II.--Yields and Quantities Based on One Net Ton of Product, Rolling from Ingots

Ingot Weight, lb.	Blossoms		Slabs		Rails		Billets	
	Bess.	O.-H.	Bess.	O.-H.	Bess.	O.-H.	Bess.	O.-H.
Yield, per cent	90.0	84.0	86.3	82.4	73.5	77.4	87.5	81.5
Scrap recovered, lb.	172	318	272	364	652	533	238	362
Cost, Cents per Net Ton								
Fuel	7	13	7	9	15	20	12	19
Power	18	15	14	25	34	16	36	23
Labor	21	32	34	35	104	108	56	54
Maintenance, Rolls, Tools	8	13	15	14	27	27	20	19
Supplies	11	14	15	12	35	60	18	27
Total	65	87	85	95	215	230	142	142

these are based on the returns of rollings amounting in a year to a million tons in each case except for plates. The conversion cost is decidedly affected, as already stated, by the ratio of output to input, and it seems contradictory or unwise to spend a considerable effort of energy and capital to save a few cents on the power factor, while other losses, particularly the matters of scaling and cropping, are accepted philosophi-

Table I.--Average Operating Data of Various Mills

Type of Mill	Rolling from	Product	Furnaces	Loss Through Scaling and Under, per cent	Loss Through Rolling and Crop Ends, per cent	Total Yield, per cent
Blooming	Ingot	Bloom	Soaking Pits (a) fired	2 to 3	7 to 12	85 to 90
Blooming	Ingot	Billet	Soaking Pits (a) (b)	2 to 1	5 to 10	89 to 93
Blooming	Slab Ingot	Slabs	Soaking Pits (a) fired	3 to 4	9 to 15	82 to 86
Rail	Ingot	Heavy Rail	Ditto	2 to 3	12 to 20	78 to 84
Rail	Bloom	Heavy Rail	Soaking Pits (a) (b)	2 to 3	10 to 15	82 to 88
Structural	Bloom	Shapes	Soaking Pits (a) (b)	2 to 3	8 to 15	82 to 90
Continuous Billet	Bloom	Billets (c) Sheet Bar (d)	None	0	5 to 7	93 to 95
Plate	Slab	Plates sheared	Yes	3 to 4	15 to 25	72 to 85
Universal Plate	Slab	Plates	Yes	3 to 4	12 to 20	76 to 85
Billet and S in a 11 Shape	Bloom	Billet and Mine Rail	Yes	2 to 3	8 to 12	86 to 90
Bar	Billets	Bars	Yes	1.5 to 3	7 to 15	84 to 92
Rod	Billets	Rods	Yes	1 to 3	6 to 11	85 to 91
Sheet	Sheet Bar	Black Sheet	Yes	4 to 5	15 to 28	70 to 82

(a)—One-third fired; (b)—Two-thirds not fired; (c)—1½x1½ in. (d)—8x½ in.

involved, the tendency is noticeable toward smaller ingots. It is also conceded that blooming down the metal does not improve the quality of the steel very much. The forging action of the process and the increase in density, etc., are rather intangible points that do not always stand close analysis. The logic that the first requisite is sound ingots attracts more followers every day. The overworked slogan of many plants, "production first" should be revised, "quality first, production next."

Table I gives the average results of yields for various mills. The secretiveness of many operating departments on this subject should give way to a broadminded discussion for the ultimate good of the industry.

It must of course not be forgotten that the furnace

Table III. Yields and Quantities, Based on One Net Ton of Product, Rolling from Blossoms or Slabs

Bloom or Slab Weight, lb.	Billets		Shapes	Sheared Plate	Universal Plate	
	Bess.	O.-H.	O.-H.	O.-H.	Bess.	O.-H.
Yield, per cent	94.0	92.0	83.0	75.2	76.0	85.5
Scrap recovered, lb.	85	139	352	586	524	272
Costs, Cents per Net Ton						
Fuel	2	3	17	27	24	35
Power	20	20	39	38	67	37
Labor	42	29	161	171	113	134
Maintenance	19	11	58	45	45	36
Supplies	18	13	55	50	45	52
Total	110	76	330	334	294	294

cally as inevitable. Progress has undoubtedly been made in the last few years, but it is undeniable that the bettering of blooming mill performance offers to the American operator the best opportunity to reduce leaks, and thus to realize a material saving in cost of operation.

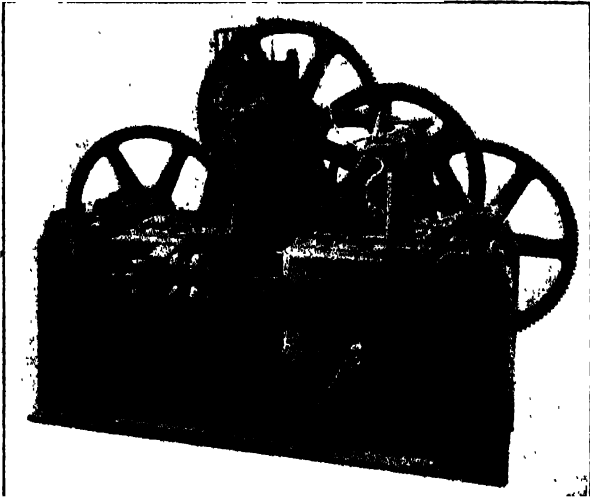
Rogers, Brown & Co. Conference

The annual conference of the members of the firm of Rogers, Brown & Co. with their branch office managers, was held in Cincinnati, Jan. 5 and 6. The sessions opened with a luncheon at the Business Men's Club, to which all members of the firm, branch office managers and local salesmen were invited. On Thursday evening all were present with their wives at a dinner at the home of D. B. Meachem, president of the company. During the evening, Wm. A. Rogers, senior member of the firm, gave an interesting account of his experiences on a recent four months' trip to South America. Mr. and Mrs. Rogers crossed over the Andes Mountains where few white people had ever been before, and Mr. Rogers' account of their trip was a thrilling one. Stereopticon views of scenes along the route were shown. On Friday the guests were again entertained at luncheon at the Business Men's Club. Business conditions during the past year and the prospects for the future were discussed at the conference. It was the general opinion of the members of the firm and the branch managers that this year will show a great improvement over 1921. All indications seemed to point that way in the opinion of those present, and while not unduly optimistic, they all felt that in the last half of the year, conditions in the iron and steel industry will travel a long way back to normal.

New Machine for Making Hot Pressed Nuts

A new machine which, it is claimed, will produce hot pressed hexagon nuts with only 10 per cent waste, as against 50 to 60 per cent by other methods, has been developed by the Acme Machinery Co., Cleveland. The lowering of the percentage of waste in material is accomplished by means of indenters which indent the bar and thus avoid the side scrap.

A nut bar of special section is used which in the first operation is deeply indented on both sides, forming symmetrical angles of 60 deg., one on each side of the bar. As the indenters withdraw, the cut-off slide



Hot Pressed Nut Machine. A nut bar of special section is indented on both sides, the blank sheared off and carried into the die. The nut is then formed, punched and ejected

advances, shearing off the blank and carrying it into the die box. Two punches then advance from opposite sides, going part way through the nut blank and compressing it in the center. The surrounding metal flows and fills all parts of the die, producing the sharp corners on the blank and the crown as well. One of these punches then punches out the core, after which the nut is ejected from the die.

The machine, as shown in the illustration, is of simple design and all parts are easy of access. The bed is an open-hearth steel casting and the gear wheels are of steel with cut teeth. The main slides are protected by the gibs, which serves to preserve the alignment of the guideway and minimize the cost of maintenance. The tools and punches are of simple design and are made of air-hardening steel. The machine is equipped with a simple automatic relief device that prevents undue strain during operation.

Four sizes are made, the capacity of the smallest machine being $\frac{3}{8}$ to $\frac{1}{2}$ in., and that of the largest, 1 to 2 in. The strokes per min. for these machines is 70 to 75 and 35 to 40 respectively.

Antidotes for Carbon Monoxide Poisoning

Carbon monoxide poisoning is one of the most frequent causes of industrial accidents, says the United States Bureau of Mines. It is an ever-present danger about blast and coke furnaces, smelters and foundries. There appears to be no uniformly recognized treatment for a person overcome by carbon monoxide. In the rescue work of the United States Bureau of Mines, however, a method has been developed which has been supported by laboratory investigation, and has proved successful in practical experience over a period of years.

The first and most important thing in caring for a case of acute carbon monoxide poisoning is to get the poison out of the blood. Every moment that it shuts the oxygen out of the hemoglobin adds to the chances for failure of respiration and failure of the heart. Every minute that the tissues are supplied with only a part of the oxygen they need increases the danger of their degeneration and permanent damage.

The first step is to get the victim away from the

atmosphere of carbon monoxide; the next is to supply him with oxygen. Fresh air is one-fifth oxygen. If a tank of pure oxygen is available, it is far better to use it, as the action is much faster and the after-effects, especially the headache, are much less severe.

All ambulances should be equipped with oxygen tanks. When the victim's breathing has stopped, or is very weak and irregular one of the rescuers should begin artificial respiration by the Schaefer method at once.

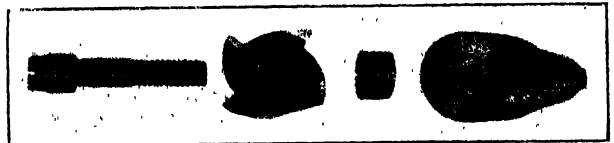
Continue artificial respiration, if necessary, for at least three hours without interruption, or until natural breathing has been restored or a physician has arrived. Even after natural breathing begins, carefully watch that it continues. If it stops, start artificial respiration again.

The patient should be kept quiet and lying flat to help his weakened heart. When he revives he should not be allowed to walk about or in any way exert himself, for there is danger of heart failure. Heat from safety lamps, hot-water bottles, or warm bricks, rubbing the arms and legs, and keeping the patient well covered with blankets all help the circulation and aid in tiding the body over a period of low vitality. The safety lamps, hot bricks, etc., should be well wrapped in cloth or paper as a precaution against burning the patient. Other stimulants, such as hypodermics of caffeine-sodium benzoate or camphor in oil, should not be administered except by a doctor, after he has considered the possibility of over-stimulation and consequent collapse. The patient should be kept in bed for a day at least. Later he should be treated as a convalescent, being given plenty of time to rest and recuperate. Just how long this time should be depends on the severity of his poisoning and should be decided by his physician.

Details of methods employed in the treatment of carbon monoxide poisoning, including a description of the Schaefer method of artificial respiration, are given in a report which may be obtained by applying to the Bureau of Mines, Washington.

New Interchangeable Spot Facer

An interchangeable spot facer intended to meet the demand for a low priced and economical production tool has been placed on the market by the Eclipse In-



The Boss on Cutter Fits Hole in Holder

terchangeable Counterbore Co., Detroit. It is known as the Junior and the component parts are shown in the illustration.

The complete tool consists of a nickel steel holder, an externally and internally threaded nut screwed into the holder, a high-speed steel spot facer with milled flutes and a machine-steel pilot. The ground boss on the spot facer fits into the hole in the holder, serving to align both accurately. The pilot nut is screwed into the holder and permits of instant removal of the shank of the pilot in case of breakage. The pilot nut may also be removed and replaced with one having a smaller internal thread, permitting the same holder to be used with many different pilots and spot facers. The end of the pilot head has a screw driver slot and also flats for removal by pliers or wrench.

The new tool can be used with standard Eclipse holders and standard pilots by using an adapter. Several sizes of spot facers are made from $\frac{1}{2}$ to 3 in., and the shank of the holder is made with a No. 2, 3 and 4 Morse Taper. The tool is also furnished without pilots.

The Studebaker Corporation, South Bend, Ind., made a new record for production, the week ending Dec. 21, when 1080 automobiles were completed. More than 7000 men are employed in the company's South Bend plants.

New England Foundrymen's Association Annual Meeting

The New England Foundrymen's Association held its twenty-sixth annual meeting Wednesday evening, Jan. 11, at the Exchange Club, Boston, with a new high record attendance. C. S. Lovell, president, presided. He was succeeded, in the election, by E. H. Ballard, General Electric Co., Everett, Mass. Mr. Ballard, formerly vice-president of the Association, is succeeded by George A. Ray, Taylor-Fenn Co., Hartford, Conn. George H. Gibby, Gibby Foundry Co., East Boston, and Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., were re-elected treasurer and secretary, respectively. The executive committee consists of Charles A. Reed, Reed, Fears & Miller, Boston, pig iron and coke; L. M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I., small tools and machine tools; Harry T. Welch, Milford Iron Foundry, Milford, Mass.; R. F. Harrington, Hunt-Spiller Mfg. Corporation, Boston, gun castings, etc., and Norman Russell, Albert Russell & Sons Co., Newburyport, Mass.

The meeting was called to order shortly after five o'clock, following which there was an informal reception. Dinner was served later in the evening at which Mr. Ballard presided. After-dinner professional talent, the New England Foundrymen's Association and the New England Coal & Coke Co. orchestras furnished entertainment and music. Charles A. Reed had charge of the arrangements.

First Meeting of Molding Sand Research Committee

The molding sand committee, recently organized under the auspices of the National Research Council and American Foundrymen's Association, held an interesting meeting in the Engineering Societies Building, New York, on Dec. 9. This was the first meeting of the whole committee.

Hundreds of thousands of tons of molding and core sands are used annually in the iron, steel and non-ferrous foundries of America. A large proportion of the expense involved is in the transportation of such sands and their handling in the foundry. A little of it is re-used; much more might be. Moreover, sands are not always correctly selected for specific purposes. Mixing and other treatment can secure improvement.

Under the direction of the Division of Engineering, N. R. C., and the American Foundrymen's Association, a valuable digest of literature has been made by Prof. R. E. Kennedy, University of Illinois, and distributed to the members of the committee and others interested. Practical foundrymen regard this as a most important treatise on the subject.

Three sub-committees are actively at work. The sub-committee on standard tests has reached agreement on six tests which will show the properties that are most indicative of satisfactory working conditions of the sand in almost all lines of foundry practice. The "fineness" test and "cohesiveness" test were reported as the two tests which should be given first consideration. Tests for permeability, water content, and thermal properties, and rational and chemical analyses, should also be considered in a general study of molding sands. The American Society for Testing Materials is to be invited to appoint representatives on this committee to help standardize the methods of making such tests.

The sub-committee on reclamation of old molding sands and greater use of old sands in molding and core-making operations is preparing a questionnaire for submission to the foundries which will bring out the proportions of sands reclaimed and the methods of reclamation.

The sub-committee on synthetic sands will confine its attention at first to mechanical means for mixing.

Under the guidance of Prof. H. Reis, Cornell University, cooperation will be secured from state geologists and the director of the U. S. Geological Survey, in making a thorough survey of sand deposits in this country that are suitable for foundry use. The cooperation

of men having like interests in Canada, England and Belgium has been secured.

R. A. Bull, Spondly Building, 639 Diversey Parkway, Chicago, has been elected chairman of the molding sand research committee, and Prof. R. E. Kennedy, 909 West California Street, Urbana, Ill., is secretary.

Practising Engineers Invited to Meet in Chicago

The American Association of Engineers will hold a conference of practising engineers at the Congress Hotel in Chicago, on Wednesday, Feb. 22. The tentative program includes the following subjects:

- How to sell engineering service.
- Experience of the practicing engineer with licensing:
 - (a) State reciprocity.
 - (b) Licensing of engineering corporations.
- Publicity for practicing engineers.
- Cost accounting for engineering service.
- Bookkeeping for an engineering office.
- How to uphold the standards of services and fees.
- Amendment of schedules of services and fees:
 - (a) Providing for other branches, such as mining and mechanical.
 - (b) To fit them to the practice appertaining to the several parts of the country.
- Computing the practicing engineer's income tax.

Ohio State Foundrymen's Association

The board of administration of the Ohio State Foundrymen's Association at a meeting in Cincinnati on Jan. 5, reviewed the report of the committee appointed to discuss a standard code of foundry practice. The report was returned to the committee for further revision and will later be presented to the entire membership for their criticism. It was decided to hold the next general meeting of the association at Cleveland during the session of the American Foundrymen's Association. This will be the annual meeting of the Ohio State Association and five new members of the board of administration are to be elected. President Weber appointed a nominating committee to compile a list of 10 men who will be balloted on for the positions on the board. Other business taken up at the meeting included the legality of the pig iron contract as approved by the National Association of Purchasing Agents. This contract was discussed in all its phases and was referred to the association's attorney for legal counsel and advice.

Chicago Engineers Will Consider Stabilization

The Chicago chapter of the Society of Industrial Engineers, will hold a series of eight meetings to consider and analyze the various phases of the "Stabilization of Industry." The meetings will be held on the second Tuesday of each month at the Auditorium Hotel, Chicago. Not only because stabilization has a special significance now, but because it has been and will continue to be a practical problem, the Chicago chapter has decided to open these meetings to the public. The first meeting was scheduled to be held on Tuesday evening, Jan. 10, with John W. Thomas, vice-president of the Central Trust Co., Chicago, as chairman. The speakers were announced as Dorr E. Felt, president of Felt & Tarrant Mfg. Co.; Maurice G. Gerard, industrial engineer of Gerard, Graham & Co., and Arthur J. Todd, labor manager of B. Kuppenheimer & Co., all of Chicago. The topic of the first meeting was "Business and Economic Need for Stabilization."

Research Progress in the Metallurgy of Aluminum

At the Pittsburgh Experiment Station of the United States Bureau of Mines, various problems in the metallurgy of aluminum and its alloys are being investigated by R. J. Anderson, metallurgist, aided by J. H. Capps, assistant chemist.

An investigation, made in cooperation with a number of foundries, of inclusions in castings showed that such inclusions, which are a source of much loss, could be practically eliminated by proper precautions. A report describing the investigation is being published by the bureau. Work is now under way on causes and

prevention of cracks—the most important defect in aluminum castings.

A general investigation of scrap losses in aluminum-alloy foundry practice showed that the annual losses in the United States amount to about \$1,200,000, and that universal adoption of methods recommended by the Bureau would probably result in a saving of about \$600,000 per annum. The complete results will be set forth in a bulletin to be issued by the Bureau.

Another proposed bulletin covers the various commercial methods for the preparation of aluminum-copper alloys; a paper prepared discusses gas atmospheres in melting furnaces; and a comprehensive bulletin on the manufacture, properties and uses of aluminum alloys is in course of publication. A study of the melting losses in aluminum metallurgical practice and of the comparative efficiency of various types of furnaces has been completed. A preliminary report has been published by the Bureau in mimeographed form and the complete results have been prepared as a bulletin.

A paper entitled "Iron-pot Melting Practice for Aluminum Alloy" has been prepared. This type of furnace was given special attention because of its general use for aluminum-alloy melting.

In the study of methods for determining aluminum and aluminum oxide in aluminum and aluminum alloys a new rapid method for the direct determination of aluminum has been devised and will be described in a bulletin in course of preparation.

In connection with the aluminum investigations, about 1000 macrographs and micrographs of samples have been prepared. A paper has been prepared by Mr. Anderson on "Ferric Sulphate as a New Etching Agent in the Metallography of Aluminum." Another paper entitled "Castings of Light Aluminum Alloys," deals with the macrography of light aluminum alloys, and a third paper, dealing with the faulty design of castings and the effect of columnar crystallization on cracks and other defects, has been written.

The section has co-operated with aluminum foundries, principally in the Detroit and Cleveland districts, in connection with general problems arising in the melting of aluminum alloys and in the founding of sand castings.

National Research Council Offers Free Information Service

The research information service of the National Research Council is prepared to supply to those interested information about scientific instruments, apparatus and supplies, laboratory construction and equipment. The following are samples of requests answered recently:

"Where may we purchase inexpensive photomicrographic apparatus?" "Where may a human skull be purchased?" "Who manufactures a good grade of selenium cells?" "Advise where lantern slides on European Geography may be obtained." "Where may the Lummer-Brodhun cube be obtained?" "What concern makes gages recording in fractions of an ounce?" "Where may apparatus and accessories for the study of sensitiveness of photographic plates be secured?"

Requests should be addressed to the National Research Council, Information Service, Washington.

Courses of New York University in Labor Handling

The School of Commerce Accounts and Finance, New York University, is offering two courses pertaining to the improvement of labor: One, devoted to labor and employment management, conducted by J. D. Hackett; the other, devoted to the principles and methods of training employees, conducted by J. W. Dietz, Western Electric Co.

The first part of the course conducted by Mr. Hackett, which will have been completed by Jan. 12, was given over to a discussion of specific methods of hiring the worker and placing him in his new position. The second part of the course will start Feb. 2. The following will be considered: Accident prevention, safety organization; fire prevention; medical and surgical care, emergency hospital, physical examination; hygiene; health conservation, ventilation, heating, hu-

midity, lighting; lunchrooms, cafeterias, food supply; sanitation, wash rooms, locker rooms, laundry, sanitary accommodations, cleaning; insurance, pensions, mutual benefits; wage systems, payment methods; profit sharing, stock ownership; hours of work; recreation, games, clubs; trade unions, strikes, collective bargains; industrial unions; industrial democracy and employees' representation.

The first part of Mr. Dietz's course was completed on Jan. 11 and dealt with methods of training minor employees, supervision of such training and the organization and administration of training departments. The second part will start Feb. 1 and will take up: The selection, training and development of technical experts, future executives, foremen and other members of the supervisory force, as well as the special methods used in training the instructors of such groups; co-operative and continuation schools; evening schools, both company and public, and other recognized auxiliary educational agencies; other features which contribute to the success of a training department, including the use of the house organ, library and methods of obtaining close and correct co-operation with trade and national associations.

Results of a Research on Fatigue of Steel

During the world war the question of the strength of airplane parts, and other problems of material under repeated stress, brought the whole subject of fatigue phenomena of metals to the attention of the National Research Council. The result was the organization of an investigation by the cooperation of the National Research Council Division of Engineering, Engineering Foundation, and the Engineering Experiment Station of the University of Illinois.

Bulletin No. 124 of the Engineering Experiment Station of the University of Illinois, entitled "An Investigation of the Fatigue of Metals," is a progress report of the first part of this investigation, having for its object the determination whether or not there exists any clearly defined relation between static properties and ability to resist repeated stresses. It having been decided not to enter the field of non-ferrous metals at this time, a series of tests of materials well scattered over the field of ferrous metals was made, and in most cases two or more distinct heat treatments for each metal were studied.

The results of these tests, and the conclusions to be drawn therefrom are given in Bulletin No. 124, copies of which may be had without charge by addressing the Engineering Experiment Station, Urbana, Ill.

New York Purchasing Agents to Meet

The Purchasing Agents' Association of New York will meet at the Builders' Exchange Club, 34 West Thirty-third Street, New York, on Jan. 17., Francis H. Sisson, vice-president Guaranty Trust Co. and Jules S. Bache, J. S. Bache & Co., will be the speakers, Mr. Sisson on "Methods of Financing Export Trade," and Mr. Bache on the "Sales Tax." The members of the association as is the custom at the monthly meetings will hold a general discussion on the trend of the times.

COMING MEETINGS

January

Engineering Institute of Canada. Jan. 24 and 25. Annual meeting at Montreal. J. L. Busfield, secretary-treasurer Montreal branch, 280 St. James Street, Montreal.

February

American Boiler Manufacturers' Association. Feb. 13. One-day winter meeting. Fort Pitt Hotel, Pittsburgh. Secretary, H. N. Covell, 191 Dikeman Street, Brooklyn, N. Y.

American Institute of Mining and Metallurgical Engineers. Feb. 20-25. Spring meeting. Engineering Societies Building, New York. Secretary, Frederick F. Sharpless, 29 West Thirty-ninth Street, New York.

STRIKE RENEWED

Chicago Building Trades Council Rejects Landis Award and Stands by Carpenters

CHICAGO, Jan. 9.—The Chicago Building Trades Council has finally rejected the Landis wage award and decided to stand by the carpenters and other unions which have refused to abide by the terms of the award from the very first. Only one union, that of the bricklayers, stood out against the final decision of the council. All of the unions with the possible exception of the bricklayers, are expected to call strikes on all construction jobs where non-union labor is employed in any trade capacity.

The Landis arbitration award, which was announced last September, after an investigation of several months, was formally accepted by all unions except the carpenters and one or two other minor organizations. The failure of these recalcitrant unions to conform with the terms of the award finally led to the formation of a citizens' committee, composed of Chicago's most prominent business men, which set out to force those organizations into line. The decision of the building trades council, as explained by its leaders, was in the nature of taking up the gauntlet which they considered had been thrown down by the citizens' committee, which they believe was trying to make the Landis award a shield for the introduction of the open shop throughout the building industry.

Strike Conditions Improve

Strike conditions at the plant of the Newport Rolling Mill Co., Newport, Ky., are improving steadily. More mills are being operated each week and it will be only a short time before the full plant is in operation. Plans are now being made for a resumption of operations at the plant of the Andrews Steel Co.

Conferences are being held almost daily between officials of the rolling mill company and committees of the strike employees with Safety Director Thomasson of Newport, acting as intermediary. Prospects for settlement of the strike trouble are looking better, though nothing of a definite nature has yet come out of the conferences. Walter Larkin, international vice-president of the Amalgamated Association of Iron, Steel and Tin Workers, is in Newport and it is expected that the other executive offices of the association will also go to Newport and stay there until a settlement is reached.

What was apparently an attempt to blow up the plant of the Newport Rolling Mill Co. was frustrated by the vigilance of the National Guardsmen on strike duty there.

Wages in Iron and Steel

Figures prepared by the Bureau of Labor Statistics, and covering in 1920 a total of 155 plants and 59,960 employees, show the trend in the rise of earnings of employees in the iron and steel industry, which reached its culmination in the fall of 1920. The figures are based upon returns from 28 blast furnace plants, 11 Bessemer converter plants, 19 open-hearth furnace plants, 15 puddling mills, 20 blooming mills, 11 plate mills, 4 standard rail mills, 25 bar mills, 13 sheet mills and 9 tin plate mills. These ten groups employed in 1920, individually, from 1344 men in the 4 rail mills to 12,083 men in the 28 blast furnace departments.

Distinction is made in the 1920 figures between all employees and common labor. The average hourly earnings of the former were 76.6c., ranging from 57.1c. in the blast furnace departments to 103.9c. in the sheet mills. Common labor had a much narrower range, from 47.4c. in the blast furnace departments to 53.7c. around Bessemer converters, and an average of 50.8c. The marked differences in compensation of total employees depend largely upon the proportionate number of those employees who come under the classification of common labor. As this proportion is much heavier in blast furnace departments than in other departments, and relatively lighter in the sheet and tin plate mills, the wide divergencies in average earnings

of all employees as between these departments is explained.

In the chart, the average earnings of all employees in each of the ten departments are shown separately for 1920, 1919, 1917 and 1913, except that the 1917 figures for puddling mills, rail mills, bar mills and tin plate mills are missing. This diagram has, under each department, two shaded belts and two white belts. The top of the diagram represents the 1920 hourly earning; the bottom of the upper shaded section shows the earning for 1919; the top of the lower shaded section that for 1917 and the bottom of the lower shaded section that for 1913. From this it will be easy to compare department with department at any given date.

Colorado Conditions Improved

The labor situation at the plants of the Colorado Fuel & Iron Co., is improving steadily. An additional coal mine, closed by a sympathetic strike, has been reopened upon petition of the men and at the reduced wage scale. A few days ago, the company announced a 10 per cent reduction in wages at the steel works. Shortly thereafter the employees' representatives of the steel works asked the management to make the reduction effective Jan. 1, instead of Jan. 15, as had been announced in order that some of the departments which had been closed might be reopened at an earlier date. Under this new wage scale at the steel works, common labor is getting 33c. an hour.

Proposed Cut in Miners' Wages

Illinois coal operators at a meeting on Jan. 5, sent a telegram to John L. Lewis, president of the United Mine Workers of America, insisting that a meeting be held in the near future to consider a cut in miners' wages. The operators feel that high coal prices are delaying a revival in business and they wish to open negotiations covering the whole subject of wages and working conditions prior to the expiration of the present contract with the union on April 1.

Complaint of Cambria Steel Co. Is Dismissed

WASHINGTON, Jan. 10.—In a decision made public last Saturday, the Interstate Commerce Commission dismissed the complaint of the Cambria Steel Co. vs. Director General, Pennsylvania Railroad, et al., by holding that the denial of the defendants to the complainant of an allowance for spotting cars within its plant at Johnstown, Pa., equal to the cost of such service to the steel company, had not subjected it to the payment of unreasonable rates, or undue prejudice, or to damage.

The Pennsylvania and Baltimore & Ohio railroads in June, 1914, agreed to pay the steel company the cost of doing spotting work, with the understanding that it would not exceed \$2.19 per car. In 23 of the 25 months covered by the cost study of the steel company, the cost of performing the service was shown to have been in excess of the allowance, running as high as \$4 per car. It was shown by the steel company that costs of its railroad, like those on trunk lines, had increased. The commission, however, in its opinion, written by Commissioner Aitchison, said it has not the power to direct the payment of an allowance and therefore had no authority to direct an increase in the allowance.

New York Industrial Cost Meeting.

The next regular monthly meeting of the New York section of the Industrial Cost Association will be held Thursday evening, Jan. 19, at Keen's Chop House, 72 West Thirty-sixth Street, New York. The meeting, at 8 p. m. sharp, will follow dinner at 6.30 p. m. The subject for the meeting will be "Chronometric Valuations or What the Business Man Should Know about Invested Capital, Depreciation, Amortization and Amended Returns." William F. Worcester, vice-president Lloyd Thomas Co., appraisers and engineers, will make the address, after which the meeting will be opened for general discussion.

German Attempts to Fix Steel Prices

So-called Guiding Prices Still Obtain—Scheme of Plan of Maximum Prices Detailed—Production Checked by Strikes and Exports by Competition

(Special Correspondence)

BERLIN, GERMANY, Dec. 18, 1921.—The stubborn fight for the reintroduction of official maximum prices waged by labor has come to a halt for the time being. It will be recalled that the Minister of Economics has been examining production costs at furnaces and rolling mills and on the strength of the data thus obtained proposed the fixing of maximum prices for ingots, blooms, billets, rails, bar iron and light plates, at a considerably lower level than the current so-called guiding prices. Contrary to expectations, the Government refrained from submitting definite proposals when the subject came up for discussion at a recent meeting of the Iron Control Federation but instead suggested that the meeting should put motions in this respect. Labor thereupon moved the reintroduction of maximum prices but this motion was defeated by the opposition of producers, the trade and consumers and the most astonishing part of it was that some labor delegates went over to the opposition.

In view of the prevailing conditions it was decided to continue for the time being the system of guiding prices at present in operation. This system, it was held, offered the industry and trade more elbow room especially in regard to long-term contracts.

The fixing of guiding prices will henceforth be in the hands of an appointed committee composed of representatives of producers, the trade, consumers and labor. The current guiding prices remained in a way unchanged but for the increases due to the advance of coal prices on Dec. 1, by which iron prices automatically advanced by 3.50 m. per ton for each mark of coal price increases. The augmented guiding base prices are now as follows:

So-Called Guiding Base Prices in Germany

Ingots	3,830 m.
Blooms	4,130 m.
Billets	4,230 m.
Sheet bars	4,330 m.
Structural shapes	4,930 m.
Bar iron	5,030 m.
Universal iron	5,180 m.
Hoop iron	5,530 m.
Wire rods	5,430 m.
Sheets, No. 6-11 S. A. gage and lower	5,630 m.
Sheets, No. 6-11 U. S. A. gage	6,130 m.
Plates, No. 11-20 gage	6,680 m.
Plates, below No. 20 gage	6,830 m.

Plan to Figure Prices on Costs

Though the maximum price question has thus been abandoned, or at least shelved for the present, it may nevertheless be of interest to give some space to the system of price calculations as formed the basis for the maximum price policy by the Government. The suggested prices were based (a) on a rate of exchange of 100 m. for one Dutch florin, (b) a scrape price of 3100 m. per ton (this has meanwhile receded) and (c) besides allowing a fair and reasonable quota for the replacement account, included profit at the rate of 5 per cent. Moreover, the principle of utilizing part of the so-called "valuta" profits accruing from export sales was to be revived for the cheapening of domestic prices. (The respective amounts for the different grades were already considered in the proposed maximum prices.)

The calculation and distribution of this valuta profit may be illustrated in the following example: Average production costs for bar iron, including profits, etc., and allowing for the increase of coal prices as by Dec. 1, were found to be slightly less than 5000 m. per metric ton. Figuring on an export price of 90 Dutch florins and converting at the rate of 100 m. for 1 florin, the valuta profit would work out at about 4000 m. per ton. Of this extra profit, the Minister proposed that 75 per cent, equal in this case to 3000 m., should go toward lowering the price of the material in the home market,

while the remaining 1000 m. were to be the clear profit of the exporting firm.

Assuming that, in face of the difficulties in the way of an adequate supply of the domestic market, only 20 per cent of the total output be available for export in the future, the ratio of export to domestic sales would be 20 per cent to 80 per cent, or 1:4. The aforementioned amount of 3000 m. would therefore permit of a cheapening of domestic prices by $3000 \div 4 = 750$ m. per ton, so that the proposed maximum price of 5000 — 750 = 4250 m. was justified.

This method of calculating prices and profits has come in for sharp criticism in interested quarters. The ratio of exchange of 100 m. for one florin is held to be absurd (as a matter of fact the mark has improved since the publishing of the Minister's figures) and the whole idea of inserting an ever fluctuating exchange rate as a factor in such price calculations was declared to be unworkable. The ratio of 1:4 for export and domestic sales was also subject to doubt as the export percentage is held to be below 20 per cent.

Market Strong But Speculative Buying Ceasing

Despite the recent notable appreciation of the mark, the considerable drop in industrial stocks and the sudden discontinuance of the buying craze in all commodity markets, the iron market is still continuing strong. With very isolated exceptions, demand has not lost any of its keenness so far, but it is noteworthy to point out that speculative buying has almost entirely ceased. There are distinct signs of the weak element in jobbers' circles losing nerve, as instanced by the increasing number of advertisements for spot stocks in the daily press.

Interest in the export business seems to have diminished somewhat of late, as the profit margin has been narrowed down by the improvement in the German exchange and export sales are no longer offering that strong incentive they did some weeks ago. A certain tonnage will, of course, nevertheless have to be exported in order to obtain the required amount of foreign bills for the import of raw materials. The slight reticence on the part of foreign buyers is ascribed to the prevailing political uncertainty.

Large Production Loss Through Strikes

The loss in production due to the recent strikes now turns out to be larger than was at first estimated and is now given at some 100,000 tons. The Duisburg works was laid idle for about eight days toward the end of October. The strike of the engineers and firemen at the two Dortmund plants has made doubtful the resumption before February of one of the works on the pre-strike scale. The strike at Düsseldorf, which ended with the defeat of the workers, lasted for three weeks and affected four steel producing works. Resumption of steel production will not be until the beginning of the new year.

The Witten Cast Steel Works had to close down last week for want of coal, after having operated on short time the week before, and a report has just come to hand that the Thale Iron Works had to close in part for the same reason. Krupp's also complain. According to a statement by the management, only 30 per cent of the coal raised at their own collieries is at their disposal, while the total quantity with which they are supplied amounts to 76.5 per cent of the required tonnage only. Owing to this coal shortage, steel production at the works has dropped to 65 per cent of the pre-war output during the latter months.

Exporting Quieter

A somewhat quieter tone obtains in the wire export market where business has been extraordinarily brisk

during the past weeks. Demand is still active, however, especially for barbed wire and fencing wire, which are being bought by South Africa and Argentina at prices averaging £18, f.o.b. Hamburg, for barbed wire. The base price of £12, f.o.b. Hamburg, for galvanized wire, is showing signs of softening as a result of Belgian competition. A falling-off in the wire nail business with Japan is noted. Dutch exporters have lately placed some nail orders for the Dutch Indies at 15 to 16 fl. per 100 kg., f.o.b. Hamburg.

Export prices of wire for netting to the United Kingdom are by about 10s. lower, quotation now being in the neighborhood of £14 per ton, f.o.b. Rotterdam. Here, too, Belgian competition is being felt. A gain in business with the Scandinavian countries is reported, but prices, it is complained, leave next to no "valuta" profit.

A feature of the sheet market is the slump in inquiries for heavy gages. The strong demand for light plates continues. Tubes were quieter but for some buying in boiler tubes and a falling off in demand for gas pipes is largely accounted for by quiet in the building trades due to frost.

During the past week we quoted as follows, average prices per metric ton, unless otherwise observed:

German Quotations on Finished Products

Bar iron	6,700 m.
Channels	6,600 m.
Angles	7,200 m.
Z-iron	6,700 m.
Sheets, Heavy	7,200 m.
Sheets, Medium	9,500 m.
Wire rods	8,750 m.
Wire, bright, base, per 100 kg.	900 m.
Wire, galvanized, base, per 100 kg.	1,100 m.
Wire nails, base, per 100 kg.	1,100 m.
Tees	6,500 m.
Rounds	6,550 m.
Plates	6,650 m.
Hoop iron	6,450 m.
Hoop iron, box band quality	11,400 m.
Plates, light, according to gage	13,500 to 15,500 m.

Sale of Materials at Hog Island

WASHINGTON, Jan. 10.—Announcement has been made by Sidney Henry, commercial manager of the United States Shipping Board Emergency Fleet Corporation, that the tentative program outlined for the first half of January by the material sales division embraces negotiations of sale of a number of materials, among them wire rope and cable, the first lot of steel at Hog Island, aggregating about 6000 tons, and machine tools, at Hog Island. At the Bethlehem, Pa., plant of the Bethlehem Steel Co., the Fleet Corporation has about 647 tons of fabricated steel, at the company's Steelton, Pa., plant there are about 900 tons of plain steel, and at the Harland shipbuilding plant, Wilmington, Del., there are approximately 1300 tons. All of the small and pneumatic tools will be segregated and classified within two or three weeks and ready for sales negotiations. During the week of Jan. 15, reclassification of approximately 22,000 tons of valves and fittings at Hog Island will begin and it is expected that by the latter part of the present month the Fleet Corporation will be in a position to sell all materials of this grade.

Sale of Cartridge Cases

WASHINGTON, Jan. 10.—Through the agency of the Philadelphia District Ordnance Salvage Board, Frankford Arsenal, Philadelphia, Pa., there will be offered for sale under sealed bids approximately 5,600,000 lb. of surplus cartridge cases of various sizes and components. Bids will be received not later than 12 o'clock noon Jan. 19. It is estimated that the cartridge cases analyze 68 per cent copper and 32 per cent zinc, but no guarantee is given regarding the percentage of copper and zinc content. All material is to be sold in its present condition, on board cars, at the respective plants where located and as shown.

The Allegheny Steel Co., Brackenridge, Pa., has started up after a shutdown of several weeks. Three open-hearth furnaces are making steel preparatory to starting up 10 sheet mills, on Jan. 17, on a 4-day-a-week schedule.

PITTSBURGH BASING CASE

Steel Corporation Files Answer to Amended Complaint Denying Discrimination in Prices

WASHINGTON, Jan. 9.—Denying charges of discrimination in prices made to its purchasers of different rolled steel products and declaring that the suggested order of the Federal Trade Commission in the Pittsburgh base case would be contrary to the fifth amendment of the Constitution, the United States Steel Corporation last week filed an answer with the commission to the latter's amended complaint. The Steel Corporation, through its general attorney, William W. Corlett, asks that the complaint be dismissed. The answer of the corporation contains but little new matter over and above that incorporated in its original answer, in which it denied charges made by the commission in connection with the general practice in the trade of using Pittsburgh as a base for naming prices.

The amended complaint, according to the commission, was issued in order to simplify the issue and expedite the hearings. The original complaint charged the corporation and its subsidiaries with discriminating in prices among purchasers of rolled steel products. The amended complaint makes precisely the same charges with respect to each particular rolled steel product and sets up the claim that the alleged discriminations are in violation of the Clayton and Federal Trade acts, for the reason that they are not made because of any difference in the grade, quality or quantity of the grade sold, nor because of the difference in cost of selling and transportation, nor because the price was made in good faith to meet competition.

The corporation's answer specifically mentions each rolled product in which price discrimination is charged, and denies each and every allegation, but concedes that the subsidiaries do charge different prices at different times and in different localities and commodities, according to the market price prevailing in the different localities and communities at the time of sales.

The answer states that the different prices are not made on account of differences in the grade or quality and that generally such differences in price are not based on differences in the cost of selling such products, but on difference in the cost of transportation, although in many cases they are. It is stated that such different prices are made in good faith on account of the quantity furnished to meet competition and representing the market prices prevailing from time to time.

Answering another charge, it is stated that to the extent, if any, that Western and Southern consumers may be unable to compete with Eastern consumers of the sale of different products mentioned, and particularly Pittsburgh consumers of such products, such limitation is due to their geographical position, and to the normal and natural market prices for steel prevailing in the different localities and is in no wise due to any unfair, improper or unlawful discrimination against Western and Southern consumers. It is asserted that the fabricators located outside of the Pittsburgh district are and always have been free to locate wherever it appeared to them that their business could be conducted most profitably.

Replying to a charge that the so-called extra price "extorted" through the alleged discriminatory price system applying to public works throughout the United States, which the commission says aggregates a large sum which the general public must pay through taxation, the Steel Corporation makes a sweeping denial, and particularly with reference to the charge of extortion.

In its concluding paragraph, the corporation's answer says that "an order of the kind or effect suggested in said amended complaint would be unwarranted by any law of the United States; that such an order would constitute an unfairness with respondent's liberty of contact and would amount to the taking of respondent's property without due process of law contrary to the fifth amendment of the constitution of the United States."

Waste a Basic National Problem

Secretary Hoover Says Its Elimination Will Solve Economic Distortion—Eulogizes Engineers at Meeting of Engineering Council

ELIMINATION of the waste now causing billions of loss annually was characterized by Secretary of Commerce Herbert Hoover at a dinner given in his honor at the University Club in Washington, Jan. 5, by the American Engineering Council of the Federated American Engineering Societies, as the most fundamental of all problems with which the nation must deal. The dinner in honor of Mr. Hoover was a leading event of the first annual meeting of the American Engineering Council of the Federated American Engineering Societies held at the Cosmos Club, Washington, Jan. 5 and 6.

Great distortion between the cost of commodities to the consumer and the producer exists, Mr. Hoover said, and unless this distortion, which is bearing heavily on the consumer, can be overcome the American farmer will be reduced to the status of a European peasant. The way to a solution for the country, he added, was in the direction pointed by the recently completed findings of the American Engineering Council's committee on the elimination of waste in industry.

As a result of the investigation of the engineers there had been enormous expansion throughout the country, he said, of the consideration of fundamental questions of industrial waste, adding that the standards of living of the American people were being inquired into as never before. Mr. Hoover eulogized the engineering council as a new and powerful force in the life of the nation, saying that it had won confidence as an agency of national and State co-operation which was without the slightest selfish motive and through the efforts of which no man could profit save as a citizen in common with all other citizens. "The organization of the Council," he said, "marked the evolution of the 200,000 engineers of America into public affairs as a mighty instrument possessing rare knowledge of both material and intangible values." He regards it as the duty of the Government to take up some of the problems outlined by the American Engineering Council, and the Department of Commerce had established agencies to this purpose.

Taking 100 as the basis of the cost in 1913 to the producer and consumer, Mr. Hoover pointed out that to-day the cost to the producer could be regarded as 100 while the cost to the consumer has risen to 150 and even 170. Only through the elimination of waste, he declared, can the existing inequalities be wiped out. Taxation, State and federal, has greatly increased the distortion, he said. These conditions he held were not now due to swollen profits, but to the existence of avoidable waste. Economies of manufacture, transportation, distribution and other agencies must be sought. Idle men, he declared, was one of the greatest causes of waste.

One of the biggest problems confronting the country, Mr. Hoover thought, was that of electrification, and suggested that the engineers tackle this problem in the form of a waste survey. Such a survey, he said, afforded at this time the great possibilities in the direction of effective leadership in the elimination of waste.

More than 100 members of the council and their guests attended the dinner at which Mortimer E. Cooley, dean of engineering at the University of Michigan and president of the council, presided. The council presented to Mr. Hoover a copy of a resolution passed by it in which he was extolled for "the distinguished success which has followed him in his past services to his profession, his country and mankind."

The resolution expressed the gratitude of the organized engineers of the nation over the service of Mr. Hoover in helping to organize the council, of which he

was the first president, and recorded appreciation of "the rare judgment and vision with which Mr. Hoover has directed the initial policies of the council."

B. Stefanek, minister from the Republic of Czechoslovakia, paid tribute to the American engineers for their investigation of industrial waste. The report, he said, had been translated by his government and would be widely circulated in Czechoslovakia.

Council to Continue Support of Lampert Bill

Matters taken up at the meeting included the question: Does the council approve or disapprove of the principle of licensing or registering engineers? There was long discussion on this and it was finally decided to direct the appointment of a committee to make a thorough study of the question, embracing conditions nationally. The committee is expected to report at the next meeting of the executive board.

The council voted to continue support of the legislation for the relief of the United States patent office as embodied in the Lampert bill. The report of the council's patent committee, headed by Edwin J. Prindle of New York described conditions in the patent office as alarming. It was brought out that floor leader Mondell of the House opposed the bill on the ground that it carried salaries higher than those for similar service in other departments of the Government, and that the bill calling for a general re-classification of Government employees would take care of the situation. Mr. Prindle showed from the *Official Register* of the Government that there were many Government positions involving legal or technical knowledge which carried salaries above those asked for the patent office examiners and demonstrated that the examining force would be disintegrated if it were delayed until the re-classification bill were passed. The president was authorized to confer with Mr. Prindle and to appoint, if thought advisable, a special committee to co-operate in carrying on the patent office campaign.

The committee on engineering education did not report because "the subject of engineering education is being discussed by many competent agencies and the committee prefers to make a study of these activities and seeks to co-ordinate their conclusions from the standpoint of the profession at large rather than attempt to start a new discussion."

Co-operation in the movement to prepare for cyclical industrial depressions and unemployment by resort to public works projects was voted by the council. On this subject the council received a proposal from Mr. Hoover and it was decided to confer with him as to what way the council could best provide effective aid.

Topographic mapping and the establishment of a department of public works were other legislative matters in which the council decided to continue its support.

The expectation of matters of importance to come before the committee on an early date was indicated by the chairman of the military affairs committee, Col. W. B. Parsons, New York. Lieut.-Col. John P. Hogan, New York, was appointed secretary of that committee, to fill the vacancy caused by the death of Colonel Snyder.

The work of the committee on employment, which was working on plans for a paid employment service, has been delayed owing to the illness of Morris L. Cooke of Philadelphia, chairman.

Reports of officers were approved. President Cooley in opening the sessions outlined his plans for more effective organization to be carried out in co-operation with the executive Secretary L. W. Wallace. President

Cooley plans to start soon on a tour of the South and Southwest, one of the biggest meetings he is to address being in St. Louis Jan. 18. He will speak to the Indiana Engineering Society at its annual meeting on Jan. 20. Mr. Wallace has also mapped out a traveling schedule to further the work of organization.

Membership Increases During Year

The Engineers Club of Columbus, Ohio, was admitted to membership. There are more than 20 active prospective members, according to the report of the executive secretary. The report showed that at the close of 1921 there were 8 national and 20 state and local societies, which for the year was a gain of eight member societies representing 1414 member engineers.

Considerable discussion was provoked by a plan proposed to establish a federation journal. It was agreed that some such contact should be established with the enrolled membership but there was sharp diversity as to its form. No definite action was taken. The council made provision for a continuance of its national publicity work under the direction of James T. Grady, director of the department of public information, Columbia University, New York. The results of the publicity work during the past year were described as most gratifying.

Officers

Dexter S. Kimball, dean of the college of engineering, Cornell University and J. Parke Channing of New York, were re-elected vice-presidents. W. W. Varney, New York, was again chosen treasurer, and by unanimous action of the executive board, L. W. Wallace was re-elected executive secretary.

New representatives on the council were announced as follows: *American Society of Mechanical Engineers*,

Francis Blossom, Charles A. Booth, Gano Dunn, H. H. Esselstyn, W. S. Lee, I. E. Moulthrop, John H. Stevens, A. E. Walden; *Society of Industrial Engineers*, Prof. Joseph W. Roe; *American Institute of Mining and Metallurgical Engineers*, C. H. MacDowell (succeeding Professor Richards); *Louisiana Engineering Society*, Prof. Donald Derickson; *Iowa Engineering Society*, Lloyd B. Canfield; *Duluth Engineers Club*, W. H. Hoyt; *Milwaukee Engineering Society*, Albert Blatz, Jr.

The executive board of the council for 1922 is made up as follows: H. E. Howe, Washington, *American Institute of Chemical Engineers*; Prof. C. F. Scott, of Yale University; L. B. Stilwell and Calvert Townley, New York, J. H. Finney, Washington, William McClellan, Philadelphia and L. F. Morehouse, New York, representing the *American Institute of Electrical Engineers*; J. Parke Channing and A. S. Dwight of New York, Charles H. MacDowell, Chicago, and Philip N. Moore, St. Louis, the *American Institute of Mining and Metallurgical Engineers*; L. P. Alford, New York, E. S. Carman, Cleveland, Dean D. S. Kimball, Cornell University, Prof. A. M. Greene, Jr., Troy, Dean Perley, F. Walker, University of Kansas, W. S. Lee, New York, Dean M. E. Cooley, Michigan, *American Society of Mechanical Engineers*; Prof. Joseph W. Roe, New York, *Society of Industrial Engineers*; Morris L. Cooke, Philadelphia, W. W. Varney, Baltimore, *Taylor Society*; W. E. Rolfe, *Associated Engineering Societies of St. Louis*.

The regional directors chosen for 1922 are: District No. 1, W. B. Powell, St. Louis; District No. 2, Gardner S. Williams, Ann Arbor, Mich.; District No. 4, W. J. Fisher, York, Pa.; District No. 5, Paul Wright, Birmingham; District No. 6, Lloyd B. Smith, Topeka, Kan.; District No. 7, O. H. Koch, Dallas, Tex.

BRITISH FOREIGN TRADE

Steel Exports Still Expanding in November— Imports Declining

British steel exports in November continued the upward swing recorded in September and October, according to the official data, just made public. The total was 202,059 gross tons, excluding iron ore and including scrap, which is equal to the combined exports of August and September. The October exports were 161,683 tons. Compared with November a year ago, the outgo was close to what it was then at 238,896 tons. The total for the 11 months this year stands at 1,527,302 tons against 3,107,521 tons to Dec. 1, 1920.

Iron and steel imports in November were about the same as in October. The total, excluding ore and including scrap, was 184,064 gross tons, which compares with 158,940 tons in November, 1920, and with an average per month in 1913 of 195,264 tons. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Average per month first quarter, 1921..	183,373	186,040
Average per month second quarter, 1921	109,670	96,320
Average per month third quarter, 1921..	93,804	160,727
October, 1921	161,683	159,536
November, 1921	202,059	184,064
Average per month, 1919	188,519	50,801
Average per month, 1920,	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports, Gross Tons

	Average per Month	—November—
	1913	1920
Pig iron	78,771	38,505
Steel rails	41,676	11,213
Steel plates	11,162	16,571
Galvanized sheets ..	63,506	34,244
Steel bars	20,921	30,322
Tin plates	41,208	29,418
Black plates	5,679	3,026
Steel sheets .....	.....	9,637
		6,150

Exports of steel rails have shown the most marked recovery in the above products, with galvanized sheets and tin plates next.

Imports of pig iron in November were 99,279 tons, bringing the total for the 11 months to 620,705 tons,

compared with only 179,927 tons to Dec. 1, 1920. The present rate of imports is the heaviest on record.

Iron ore imports in November were only 176,998 tons, as compared with 541,742 tons per month in 1920. In November, 1920, they were 350,714 tons. The total for the first 11 months of 1921 was 1,742,905 tons, as compared with 5,972,283 tons for the first 11 months of 1920.

Manganese ore imports were only 6174 tons in November, which makes the total to Dec. 1, last year, 165,935 tons against 405,268 tons to Dec. 1, 1920.

Independent Merger Negotiations

CHICAGO, Jan. 9.—Executives of three steel companies which have been mentioned in connection with a proposed merger met in Chicago this week and another meeting will be held in New York in the near future. Negotiations are believed to be at an advanced stage. Whether eventually a consolidation will be effected taking in the four other companies that have been mentioned in that connection may not be determined for some time, but at present, indications are favorable to a union of at least the Inland Steel Co., the Steel & Tube Co. of America and the Youngstown Sheet & Tube Co. The possibility of including a fourth company with these three has also been canvassed.

Great Southern Steel Corporation Plans

BIRMINGHAM, ALA., Jan. 9.—Great Southern Steel Corporation, which was recently organized by Chicago interests and chartered at Dover, Del., with capital stock of \$105,000,000, has taken out a charter in Alabama under capital of \$500,000 and with the announced intention of locating a steel products plant in the Birmingham district. Local mineralogists, who helped the concern to buy 100,000 acres of coal and ore land in several counties, say the new plant is to make a steel product not heretofore manufactured here. Details as to site and like have not been given. The company at present has no operating properties in Alabama.

INTERSTATE TUNNEL

Bids for Vehicular Passageway Will Be Opened Feb. 7—Iron and Steel Tonnages

Tenders for the construction of the New York-New Jersey vehicular tunnel, extending from Canal and Spring streets, New York, to Twelfth and Fourteenth streets, Jersey City, N. J., have been issued by the Bridge and Tunnel Commission, Room 614, Hall of Records, New York. Bids will be opened Feb. 7. The contract for the tunnel calls for 13,512 ft. of tunnel, constructed with cast iron segments, 29 ft. 6 in. outside diameter, with a short section, 30 ft. 4 in. in diameter and 2816 ft. of cut and covered subway at the approaches, making a total length of 18,474 ft. of construction. Entrances and exits at both the New Jersey and New York ends of the tunnel will be about two blocks distant. The contract is divided into two parts; specifications 3 and 4. The former calls for construction of the tunnel from the New York side to about the end of the rock ledge in the Hudson River and includes about 80 per cent of the iron and steel that will be used. The latter calls for the building of the river section of the tunnel and the construction on the Jersey City side, involving about 70 per cent of the total iron and steel that will go into the completed tunnel. The present contracts include all but a few hundred yards of covered subway construction at the approaches on each end.

The largest item of material involved is the tonnage of cast iron segments for the lining, 33,200 tons for specification No. 3 and 72,300 tons for specification No. 4, a total of 105,500 tons. The total iron and steel involved on both specifications is as follows: Structural steel, miscellaneous, 90 tons; structural steel for river shaft caissons, 4460 tons; steel beams and shapes, 184 tons; steel rods and bars for reinforcing, 547 tons; wire mesh, 222 tons; special rolled floor beams (about 100 lb. per ft.), 2490 tons; built up floor beams, 245

tons; steel work connecting caissons, 146 tons; steel in permanent tie rod anchorages, 1330 tons; high tensile steel tunnel bolts and nuts, 4615 tons; permanent tie rods (bolts, nuts, pins and clevises), 332 tons; copper steel plates, bolts, nuts and washers, 233 tons; ladders, hand bars and miscellaneous wrought iron fixtures, $\frac{1}{2}$ ton; wrought iron and steel pipe from 1 to 3 in., about $1\frac{1}{2}$ miles; cast steel lining, 9050 tons; cast steel pile segments, 370 tons; cast iron hub and spigot pipe, 117 tons; manholes and catch basins, 35 tons; non-corrosive alloy metal, about 7 tons; water pipe, 6-in. 13,700 ft., 8-in. 50 ft., 10-in. 1770 ft., 12-in. 10 ft.; bronze bolts, wedges and hinges, about $1\frac{1}{2}$ tons.

The time allotted for completion of the contract is three years from date of the award. At present between 75 and 80 construction and iron and steel companies and foundries have obtained specifications from the commission.

Among the iron and steel companies, foundries, machine shops and shipbuilding companies which will probably submit bids are: United Engineering & Foundry Co.; Eastern Malleable Iron Co.; Wheeling Mold & Foundry Co.; New York Car Wheel Co.; Lake Erie Bolt & Nut Co.; Midvale Steel & Ordnance Co.; Federal Shipbuilding Co.; American Steel Foundries; American Brake Shoe & Foundry Co.; Bethlehem Steel Co.; American Bridge Co.; T. A. Gillespie Pipe Co.; Central Foundry Co.; Woodward Machine Co.; McClintic-Marshall Co.; New York Shipbuilding Co.; Hooven-Owens-Rentschler Co.; United States Cast Iron Pipe & Foundry Co.; Ingersoll-Rand Co.; Chicago Pneumatic Tool Co.; Pittsburgh Screw & Bolt Co.; National Malleable Castings Co.; Lynchburg Foundry Co.; Moline Plow Co.; Diamond Machine Co.; Buffalo Foundry & Machine Co.; Birmingham Iron Foundry, Derby, Conn.; Phoenix Iron Works; Lobdell Car Wheel Co.; Topping Bros.; Sun Shipbuilding Co.; Manning, Maxwell & Moore; Howard Iron Works; Morse Dry Dock & Repair Co.; Hubbard Steel Foundry, East Chicago, Ind.; Westinghouse Electric & Mfg. Co., and the General Electric Co.

Secretary Hoover Holds Conference on Railroad Problems

WASHINGTON, Jan. 10.—Deep interest is manifested in a meeting which was held here last Saturday evening at the home of Secretary of Commerce Herbert Hoover with railroad executives and members of the four railroad brotherhoods, and possibly others.

Replying to a question as to whether the Administration had been requested by the brotherhoods to enlist itself on their behalf in favor of National agreements, a statement was made at the White House to-day that the conference was called to avoid conflicts in connection with the transportation situation. It was neither admitted nor denied that the question of National agreements was taken up, but it was stated that further conferences will be held between Government representatives with railroad executives and brotherhood men. It is understood that the Administration is concerned over the transportation rate and labor situation and is endeavoring to eliminate difficulties prevailing and threatened and to bring about stimulation of industrial activity dependent upon the existing railroad and labor problems.

The railroads, it is claimed, had no part whatever in calling the conference and what their attitude was toward questions discussed is not known. In the absence of definite information shippers have expressed apprehension lest the railroad brotherhoods are trying to compel the adoption of some agreement as to wages, working rules, etc., that would make it impossible for the railroads to further reduce rates, so urgently insisted upon by shippers as a whole. It is considered significant that the meeting was asked for by them at a time when the Interstate Commerce Commission is engaged in its general rate investigation and before it has had time to close and pass upon the case. The opinion has been expressed that the brotherhoods may be trying to have a policy determined, advantageous to themselves,

which would make it impossible for the railroads to reduce rates further and that it has sought to do this before the investigation is closed, so that the commission would have to act adversely upon requests for reduced rates.

Unemployment in Pennsylvania

The number of unemployed in Pennsylvania increased more than 50,000 in December, according to the semi-monthly report of the State Department of Labor and Industry, covering the situation as of Jan. 1. The new year starts with 321,893, men and women, registered for work at the several district offices of the department. The Pittsburgh district office is the only one of 10 which reports no increase in unemployment, and this is explained largely by the fact that no consideration was given the number at present idle as a result of the holiday suspension of steel plant operations, which is regarded as only temporary. The report by districts follows: Altoona, 15,460; Erie, 16,700; Harrisburg, 10,393; Johnstown, 17,765; McKeesport, 4300; New Kensington, 6200; Philadelphia, men, 138,000; women, 12,400; Pittsburgh, 51,400; Scranton, 42,900; Williamsport, 6375.

Charles S. Robinson, vice-president and general manager of the Youngstown Sheet & Tube Co., was re-elected president of the Engineers' Club in the Youngstown district Dec. 29, while W. C. Coryell was re-elected vice-president. G. T. Seeley, Stanley H. McKee and F. B. Thomson were chosen directors for two years, and Charles B. Cushwa, J. W. Deetrick and G. W. Knotts were elected trustees for two years. Officers will be installed at the next general meeting, Jan. 26, when Arthur G. McKee, consulting engineer of Cleveland, will address the members on "The Modern Blast Furnace."

JONES & LAUGHLIN PLANS

Pittsburgh Company Acquires Large Tract in the Chicago District

CHICAGO, Jan. 9.—The Jones & Laughlin Steel Co., Pittsburgh, has entered into a contract with the East Chicago Co. and the Newport Co. to purchase from them 900 acres on the north side of Hammond, Ind., lying on both sides of the west branch of the Indiana Harbor Canal. The price to be paid in the event that certain requirements are complied with by the sellers is \$1,450,000, or \$1,611 an acre, and the funds are now on deposit at the First Trust & Savings Bank at Chicago. The plans of the company are of an elaborate character. Blast furnaces and mills to cost between \$25,000,000 and \$50,000,000 are planned, and employment will be provided for over 7000 people. The importance of the undertaking may be grasped when it is realized that the site of 900 acres is larger than those of the Inland Steel Co. and the Steel & Tube Co. of America combined.

The passing of the Pittsburgh basing point in prices of plates, shapes and bars during the recent period of business depression, and the possibility that this method

of quoting prices will be permanently abandoned as a result of the case now before the Federal Trade Commission, probably account for the desire of the Jones & Laughlin company to have a Western plant. In Chicago circles it is felt that hundreds of other industrial companies which have heretofore served their Western customers from Eastern plants will follow the example of the Jones & Laughlin company and establish Western branches.

Confirmed at Pittsburgh

PITTSBURGH, Jan. 10.—Reports from Chicago that the Jones & Laughlin Steel Co. was negotiating for approximately 900 acres of land on the north side of Hammond, Ind., lying on both sides of the west branch of the Indiana Harbor Canal, are confirmed by officials of the company and successful termination of the deal is expected. It also is admitted that the land is for a new steel works, but it is not expected construction work will be started soon unless there is an early decision by the Federal Trade Commission in the Pittsburgh basing point case and this decision favors the complainants. The plant site gives the Jones & Laughlin Steel Co. an anchor to windward in the event Pittsburgh does not remain the sole basing point of steel prices.

JAPAN ACTIVE

Rail and Pipe Contracts Awarded—Black Sheets Less Active—Other Markets Suggest Barter

NEW YORK, Jan. 10.—The export situation is similar in every respect to the prevailing conditions during the last few months of last year. But little activity is noted from any part of the world except the Far East and buying from these markets is confined almost entirely to Japan. The activity evident in many countries in developing hydro-electric, railroad and other projects may lead to some buying later in the year. The six pipe lines of 48-in. to 52-in. steel pipe for the Taiwan Electric Power Co., which will be installed on the Island of Formosa in connection with a project for hydro-electric power, have been awarded to Mitsui & Co., and it is expected the fabrication will be done by M. W. Kellogg & Co., Jersey City, N. J. The order totals about 2700 tons. The electric equipment is understood to have been placed but the 125 miles of steel transmission towers is still pending. These will probably be fabricated in Japanese shops if the precedent established in past purchases is pursued.

The 13,000 tons of 60-lb. and 75-lb. rails for the Imperial Government Railways were also placed with Mitsui & Co., and will be rolled by the Steel Corporation. This award is reported to have been made on a price c.i.f. Japanese port of between \$46 and \$47 per ton. Other railroad equipment purchases from the Far East include fittings for about 50 passenger coaches of the South Manchuria Railway Co., for which steam heating equipment and window frames were purchased through a Japanese export house. This export house has also booked an order for 18 steam boilers and radiators with 25,000 sq. ft. of radiation. The Japanese Government is reported to be in the market for a total of about 8000 tons of structural material for two bridges.

Sheet buying from Japan shows a slight decline from its previous activity and is not expected to revive to its former proportions until late spring. Slightly more interest is now being shown in sheets of heavier gage than Nos. 30 and 31½, which have been in particular demand.

Chinese activity is confined largely to inquiring for various kinds of material in small lots. One large inquiry now in the hands of a New York exporter calls for 3000 kegs of checkered head wire nails, about 10,000 boxes of light tin plate and about 200 tons of No. 31 gage galvanized sheets.

In addition to the fabricated pipe purchased for Formosa, about two miles of 33-in. steel pipe is reported

to have been placed in the United States by a London exporter and there is an inquiry from the Philippines for about 12,000 tons of 33-in. cast iron pipe. A hydro-electric company has been formed in Chile, according to the Bureau of Foreign and Domestic Commerce. The new organization is a combination of two established companies and will operate as the Chilena de Electricidad. A new hydro-electric station of 50,000 hp. is contemplated and increase from 18,000 hp. to 28,000 hp. in another station is intended. The inquiry of the Argentine Government for several hundred tons of galvanized sheets has been revived, but the terms required of sellers are extremely severe and but little interest is being shown.

Inquiry was recently made in the American market by an Australian company for 1285 tons of barbed wire. Australian buyers often suggest transacting business on a basis of barter, because of their difficulties in marketing their products. These suggestions are not peculiar to Australian business. The Usines Metallurgiques de la Basse-Loire, 25 Rue de Clichy, Paris, recently suggested the bartering of French iron ore for American coal. This company, which claims to consume about 250,000 tons of coal a year, has ore deposits at Segre near Nantes, France.

High Rates in Cast Iron Pipe

WASHINGTON, Jan. 10.—The Interstate Commerce Commission has held to be justified the proposal of railroads to cancel the existing basis for applying rates on cast iron pipe and connections from the Birmingham, Ala., district to Montana points, and also the restoring of the old basis of the combination on St. Louis. This decision is in accordance with a previous one restoring the same basis of rate making to the Southwest. The return to this basis will have the effect of increasing rates on cast iron pipe and connections from 40c. to \$1.20 per ton.

The different rate increases during the past two years threw the rate structure out of line and the joint through rates became less than the combinations on St. Louis, Omaha and St. Paul, and placed some of the carriers at a disadvantage, it was claimed, in comparison with competitors for business through the three gateways of the Northwest.

There was partial resumption at the plant of the Pittsburgh Steel Co., Monessen, Pa., Jan. 9, after a complete shutdown on Dec. 24. No. 2 rod mill, No. 2 wire mill, part of the galvanizing department and a number of nail machines were started.

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Indices of Business Activity

There has been a rapid increase of late in the available amount of statistical matter relating to the volume and character of commercial activity. There are the various classes of statistics that long have been in use, there are the presentations made in recent years by the Federal Reserve Board, and there are the ambitiously conceived compilations of the Department of Commerce as recently organized by Secretary Hoover.

Those who wish to study business in detail can be at no loss for material. The price movements of practically all important commodities are known, and in most cases the production also. When it comes to generalizing, however, the course is not so clear, nor can it be expected to be clear. What is called "business" has extremely intricate ramifications, and the statistics cannot be less complicated than the movements of which they are the numerical picture.

It is a habit of many men to take some particular movement and follow it as being typical of "business" in general. Bank clearings make a favorite reference, as do the monthly blast furnace reports of THE IRON AGE and the unfilled tonnage of the United States Steel Corporation. Railroad earnings used to be a favorite, but unfortunately they disappeared.

Only a slight reference to the statistics of 1921 is sufficient to show the necessity for generalizing, if one wishes to obtain an idea as to how business stands, and to show at the same time the extreme difficulty of generalizing from the particulars. Three citations may be made of statistics which, off-hand, one might think ought to be typical of business in general. Debits to individual accounts at banks, freight ton-mileage on the railroads and the production of steel ingots.

Comparing 1920 and 1921, and taking 1920 as 100, the year 1921 stands between 80 and 85 in bank debits, at 75 in freight ton-mileage, on the basis of the first nine months of each year, while steel ingot production is about 48.

Here is certainly no coherence. Allowing for the decreases in commodity prices, salaries and wages, the bank debits indicate that the volume

of business, in commodities transferred and service rendered, increased from 1920 to 1921. Allowing some weight to the claims that high freight rates have not interfered greatly with the movement of valuable commodities, but have handicapped seriously the movement of heavy and cheap materials, the freight movement on the railroads, in point of value, can hardly have decreased much. The production of steel, on the other hand, dropped off by more than one-half in tonnage, while the value decreased much more.

Other divergences would be shown if we should take into the reckoning such matters as coal production, retail store trade, building permits, unemployment, postoffice receipts and the like. In conversation men often refer to "the state of general business," but it becomes evident that there is no such thing as "general business." Some lines of business appear to have been very poor in 1921 as compared with 1920, but the idea that may have been prevalent at one time that practically all business was "good" in 1920 is not tenable. Each line of business has a case of its own. There are relationships, but frequently they are far from close. There is no easy path to a conclusion as to the state of trade in general. One must study the trade movements in detail, and with particular reference to the individual problem which he wishes to solve.

The upward swing in British steel exports which began in September has continued. November had the surprising total of 202,059 gross tons, which is second to the largest movement of the year, 233,114 tons in January. While November fell below the 1920 monthly average by about 70,000 tons, it did better than the 1919 average of 188,519 tons per month and came about halfway up to the 1913 rate. It is significant that British exports were close to 80,000 tons larger than those from the United States in November. It was natural that after the long embargo caused by the coal strike, the British steel industry should show some rebound due to shipments on old contracts, but in view of the high costs of

British manufacturers the extent of the recent export movement in competition with continental countries of lower exchange is noteworthy.

Labor Efficiency—Some Comparisons

Viscount Haldane said recently: "I have no fear of British manufacturers and British workmen, if they will give themselves a chance. I think they are the best in the world." In contrast with this, an article in a London industrial publication in November said: "A quarter million men employed by the United States Steel Corporation produce 50 per cent more steel and steel products than the half million men employed by England's steel companies produce. Half a million American miners produce 10,000,000 tons of coal per week; it takes nearly 1,250,000 British miners to get 4,500,000 tons per week."

In furtherance of the latter statement, a recent issue of the *South African Mining and Engineering Journal*, showing a picture of a gathering of English miners being harangued by an agitator, has in the caption: "This is the sort of ill-reasoned action that has played havoc with the British coal industry, and has reduced her output per man to less than a third of what it is in the United States." Figures from the same publication place the coal output per underground employee in the United States at 4.40 tons per day employed, as compared with 1.19 tons in Great Britain.

Not all of this difference can be explained upon the score of individual working efficiency. It must be remembered that American use of machinery and power is greater than is to be found anywhere else in the world, not only in coal mines and steel mills, but in most other industrial processes. Shipbuilding plants in the United States are equipped with an outfit of cranes and other weight-handling appliances far in advance of those used in any except the best of British plants. High wages have forced us to use much machinery. Hence, a very considerable increase in production per man is inevitable, even with no gain in individual productive efficiency.

When all allowances are made, however, for all mechanical aids to greater production, the fact remains that American workmen, on the average, where their work has not been corroded by interference on the part of walking delegates, have consistently produced more per working day and per working hour than can be shown in other countries. They have received a larger wage and they have earned it.

Reference to the railroad problem brings to mind again the fact that the present rates and wages are beyond the capacity of industry to carry. At the same time it must not be forgotten that even the present swollen freight rates are far lower than the freight rates in any other country, and that in spite of our very great operating costs, brought about in large measure by swollen wage scales. During the first half of 1921 the average freight rate per ton-mile in the United States was 1.278c. This is to be compared with 3.5c. per ton-mile in England during the same period.

It must not be inferred that the above is an expression of satisfaction with present returns from labor. Nothing can be further from the truth; for labor, notably in railroad, building and mining, is giving a much smaller return for the wage received than we have every right to expect. It will be evident, however, that our position in this matter is better than that of other nations with which we are competing for the markets of the world (apart from longer hauls on raw materials, in some cases, and longer hauls to seaboard), and those who have been decrying our ability to hold a reasonable amount of our foreign trade have apparently left out of the account some of the relationships mentioned above.

Cost of Employing Steel

It has been a matter of common remark, and critical remark, that in the decline in commodity prices that began in 1920 prices of manufacturers took the lead in falling, wholesale prices following and retail prices coming far in the rear. Somewhat the same alignment is observed in prices of pig iron, steel and wares made from steel.

While the percentage relations between pig iron, semi-finished steel and the regular rolled products of the mills are much the same as before the war, the influence of the great advance in freight rates, which falls chiefly upon pig iron on account of the large tonnage of raw material that must be assembled, should cause pig iron to show a greater percentage spread above pre-war prices than is shown by finished steel. This is not the case. Relative to cost of manufacture, pig iron is now cheaper than finished steel.

Comparisons of prices now being received by the steel mills for their regular products, such as bars, plates, sheets, etc., with the prices of various things that are made from steel show in the great majority of cases that the finished wares are much farther above pre-war prices than are the steel mill products. Of course there are exceptions, but the average is as indicated. The steel wares that are sold at retail to the ultimate consumer, such as machinists' and carpenters' tools, show the greatest excess.

When cost is the controlling element in determining the volume of consumption, and in the last analysis it usually is, it is the price to the eventual consumer or user that governs, not the price of intermediate materials or the wholesale prices of the finished wares. The obliqueness of view of those who last spring were clamoring that the steel mills should reduce their prices to stimulate business has been fully indicated by subsequent events. Steel prices have been liquidated in a drastic way, yet ultimate consumption has not increased greatly. The ultimate consumer, whether the householder, the artisan or the investor, is not getting the full benefit of the declines that have occurred in what is called "the steel market."

The explanation both for the divergence between manufacturers' prices and retailers' prices

for commodities in general and for the divergence between steel prices and prices of wares made from steel is probably that competition has been more effective at some points than at others. The wholesalers who buy from manufacturers and the retailers who buy from wholesalers are discriminating and induce price competition. The general public, which buys at the drygoods store or the corner grocery, is not so discriminating, the result being that there is less competition in retail trade. In steel, the competition between steel mills in the past six months has been very keen. The competition between those who work up steel into various products has not been so keen. In a sort of way it is a case of what is everybody's business being nobody's business. This is, by the way, the precise thing that afflicts the building trades generally, for in the case of the man wishing to spend money for the erection of a garage, a dwelling house or other structure there is a different individual each time.

The cost of steel in its ultimate use is at a much higher percentage above its pre-war level than is the case with steel mill products, and in that lies one of the obstacles to a great broadening in the use of steel. The relatively low prices of rolled steel may, and probably will, cause buyers to stock up in a moderate way, but that will only temporarily swell the volume of demand upon the mills. What is needed is a lower cost in employing steel in its final form.

Electrolytic Iron

A new and important advance in electrometallurgy is represented by the announcement of a new commercial process for making electrolytic iron from an ore. Electrolytic copper has been a development of only recent years and now has the leading place in that market. Electrolytic tin and zinc are more recent commercial products, already factors in their respective markets. What place will electrolytic iron take in the field that is now occupied by product coming chiefly by the route of the blast furnace, steel works or puddling furnace and rolling mill?

The details of the Eustis process for the manufacture of electrolytic iron tubes and other products were the subject of an illuminating article in *THE IRON AGE* last week. One vital feature distinguishes this American process from the French and older methods. It is the use of an ore instead of scrap iron as an anode. In the new process pyrrhotite, or a high sulphur iron pyrite, largely FeS_2 , is the basis of a cyclical chemical process which furnishes ferrous chloride in constant and ample quantity as an electrolyte. This ore not only exists in the United States and Canada in millions of tons but is practically valueless for iron smelting or for sulphuric acid manufacture. It is possible to burn out only a small percentage of the sulphur. The Eustis process therefore has to its advantage a cheap raw material, the production of copper and sulphur as by-products, and an electrolyte purer than that usually obtainable from iron scrap.

The fields of usefulness for this pure iron—an iron of greater purity than has been attainable by any other process—are outlined by Mr. Stoughton. The application of its striking physical properties to other products than tubes opens up not a few possibilities. The principal drawback is the cost of electricity. This has been largely overcome in the case of electric steel and other commercial applications of the electric current. The elimination of costly smelting and complicated refining processes and the simultaneous recovery of by-products are marked advantages of the American electrolytic process. It is to be noted also that "it is unique in metallurgy for one brief cycle of operations to deliver in marketable form more than 90 per cent of any ore."

Splitting Furnace Shafts

Investigations of swelling and cracked blast furnace shafts have indicated that zinc in the iron ore and possibly in the limestone, even when existing in small amounts, has a cumulative effect that is not to be overlooked. The distortion of the steel plates, with splitting either vertically or horizontally as the final effect of the stresses set up, has commonly been charged to the refractories. At first there was a disposition to claim that the action resulted from inferior brick work, due in part to the lowered efficiency if not indifference of the brick makers; and then the phenomena were seized on by the advocates of hand and machine-pressed bricks, each trying to prove that the product of the other was inferior. The fact that the expansive force in the refractory lining might be explained by the presence of the zinc was not allowed to weaken either case. One or the other type of brick was simply condemned as being more easily permeable by the zinc. Thus disintegration might occur, requiring relatively early relining, or the material allowed impregnation though remaining in firm masses against which the expansion of the zinc could force the outward bulging of the steel shell.

Now, the view is taken that the condition of the brick work is a secondary matter and that the situation naturally results from the inability of the blast furnace easily to rid itself of zinc once introduced. It appears that zinc troubles have been met with in long runs with ores lean as regards zinc and that they are likely to be frequent and pronounced where the furnace burden has high percentages of zinc.

It has been explained that the zinc oxide in the downward passage in the furnace is reduced in the fusion zone and the metallic zinc in vapor form passes upward with the gases, largely to be carried outside of the furnace. A portion is caught in the upper strata of the stock and may be oxidized again by the furnace gases. This zinc oxide then descends and the process is repeated. Meanwhile some of the zinc is deposited on the brick work, impregnating it and the joints in both the metallic and the oxide form. The action is accentuated in regions of the shaft cooled on the outside. The fact that metallic zinc has a linear

co-efficient of expansion fully five or six times that of the brick lining (with some claims of a much higher expansion ratio) is advanced to explain pressures great enough to tear the steel work. The condition is an argument for the thick rather than the thin shell, which a few years ago had some vogue, and it explains the steel banding of shells provided usually after indications of swelling.

Pending a definite contribution to the literature on the subject, it behooves the furnace operator to watch the zinc content of his burden, particularly if, as under present commercial conditions, he expects repeated bankings, with all that the cooling down may do in favoring zinc accumulations.

Plant Purchased by Canton Forge & Axle Co.

The Canton Forge & Axle Co. has purchased the drop forge plant of the Standard Parts Co. at Canton, Ohio. This plant is equipped with modern forging and heat treating equipment, including drop hammers of sizes running up to 12,000 lb. and upsetting machinery. Heretofore the product has been entirely absorbed by the Standard Parts Co. in the manufacture of axles and other drop forgings going into automobiles.

The new corporation will still be the source of supply for Standard Parts Co. forgings. In addition the new management will enter the market for all kinds of general commercial drop forge work.

The officers of the Canton Forge & Axle Co. are: F. A. Poor, chairman of board; F. C. Moore, president; H. C. Holloway, secretary; Thomas F. DuPuy, general manager.

Increased Capacity in Operation at Youngstown

YOUNGSTOWN, OHIO, Jan. 10.—Steel plant operations in the Mahoning Valley are on a moderately broadening scale. Forty-five of the Valley's 113 sheet mills are under power, 12 of 17 pipe furnaces are fired, while 28 of 51 independent open-hearth furnaces are charged. Sheet mill production compares with a recent low of 20 per cent.

The Youngstown Sheet & Tube Co. has reduced the number of its active sheet mills from 15 to eight, while the Brier Hill Steel Co. is operating but 10 of 28 such units. The Republic Iron & Steel Co. has four of 18 sheet mills active, Falcon Steel Co., 5, Newton Steel Co., 10, and Trumbull Steel Co. and Sharon Steel Hoop Co., four each. The plant of the Newton company had been idle two weeks for repairs.

The Carnegie Steel Co. is operating five blast furnaces, while its finishing mills are around 60 per cent.

More Building in Chicago

Building construction in Chicago made an excellent showing in 1921 despite adverse conditions. Permits were taken out for 7800 structures, extending over a frontage of 233,025 ft., and involving a total cost of \$124,028,010, as compared with 3745 buildings, 135,440 ft. of frontage, and a cost of \$79,102,650 in 1920. The record for 1921, in terms of frontage, is the best of that for any year since 1916. It falls below the years 1905 to 1916 inclusive, however, when frontage totals ranged from 243,485 ft. in 1905 to 327,496 ft. in 1916.

Confusion has arisen over the identical names of the National Engineering Co., Chicago, and the National Engineering Co., Irwin, Pa. The Chicago company is the manufacturer of foundry appliances and of the Simpson patented specialties utilized largely in foundries generally, while the Irwin concern is a manufacturer of electrical devices.

Sharp Decline in Steel Ingot Output in December

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in December of 1,427,093 gross tons, as compared with 1,660,001 tons in November and with 803,376 tons in July. The December decrease from November was 232,908 or 14.03 per cent. The increase in November over October was 2.67 per cent. Estimating the production of other companies on the basis of the 30 companies (though it is probable the small companies did not equal the rate of the larger ones) the total output of ingots in December was 1,694,885 or 67,795 tons per day.

In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	658,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,285,865	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	217,755	2,160	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,234	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total, 1921	13,125,578	3,679,682	21,086	16,826,946

The December ingot production was at a yearly rate of 21,084,245 tons, counting 311 operating days to the year. This compares with a rate in November of 23,581,886 tons and with 11,857,186 tons in July, the year's low point. The December decrease was due largely to reduced operations of independent steel companies.

The decrease of 232,908 tons in the ingot output of all companies reporting in December from that in November contrasts with an increase of 233,605 tons in December pig iron output over that of November.

Annual Carnegie Steel Co. Dinner

The twenty-fifth annual dinner of the executive, sales and operating officials of the Carnegie Steel Co. was held at the William Penn Hotel, Pittsburgh, Saturday evening, Jan. 7. As usual, the affair was strictly a company affair. President James A. Farrell of the Steel Corporation was present. Hugh P. Tiemann, metallurgical engineer, spoke on "Quality Requirements"; James M. Camp, salesmanship engineer, discussed "The Carnegie Steel Co. and Occupational Training"; Louis C. Bihler, traffic manager, discussed "The Present Relations of Transportation to Industry." The subject of Dr. John S. Unger, research expert, was "Future Probabilities."

The Wainwright Engineering Corporation, Connersville, Ind., manufacturer of piston pins and pistons for automobile motors, has been merged with the McQuay-Norris Mfg. Co., St. Louis, one of the largest manufacturers of piston rings in the world. The Connersville concern will be known as the McQuay-Norris Mfg. Co. of Indiana, Wainwright division. Harry A. Wainwright, vice-president and general manager will continue in that capacity. As a result of the merger, the volume of business by the plant is expected to increase 25 to 50 per cent.

Iron and Steel Markets

JANUARY QUIETNESS

Some Car and Rail Buying But Little Else

Steel Corporation's Preponderance in 1921 Output—Coal Strike Possibilities

Little activity was expected from the first half of January, with inventories uncompleted, and the quietness in iron and steel in the past ten days is not disappointing. Operations thus far have been slightly less than the average for December, the Steel Corporation's percentage now being 46 or 47, against 49 last month, while the independent companies are to-day about 28 per cent, after averaging 31 per cent last month.

The December steel output of 1,427,000 tons of ingots by 30 companies reporting—a falling off of 233,000 tons from November—indicates that the country produced about 19,300,000 tons of ingots in 1921.

The Steel Corporation, which operated all through last year at a higher rate than the independents, probably produced a larger percentage of the total than in 15 years. While its steel making capacity is about 45 per cent of the total, it changed places with the independents in actually turning out at least 55 per cent of the country's output in 1921. Official returns may show that it nearly equaled the 57.8 per cent which was its share in 1906.

In casting up the prospects for blast furnaces and mills, in looking toward the active season, manufacturers recognize that much hinges on the extent to which freight rates and coal mining and building labor are brought into line with the drastic deflation in steel. The possibility of a bituminous coal strike in April and the check it would put on iron and steel production are also regarded as factors of uncertainty.

Railroad demand, as for some time past, has been the principal item in the limited market news of the week. At Chicago the Union Pacific placed 4500 cars and the Illinois Central 2000. Action by the Great Northern is expected next week.

The Pennsylvania Railroad's rail order for 80,000 tons brings the total of 1922 business above 500,000 tons, but it is to be said that most of the large orders are now out. The Pennsylvania has over 45,000 tons still to come on its 1921 contract, besides having 25,000 tons in stock, so that its probable wants for the year are covered. Track supply orders are coming along with rails, indicating active spring work on track. The Louisville & Nashville is asking for 3500 tons of splice bars.

Rails and tin plate largely account for the Steel Corporation's increase of 17,872 tons in unfilled orders on Dec. 31. Its share of 375,000 base boxes of tin plate bought by the Standard Oil Co. for export was one of the large items.

In the matter of prices plate mills divide into two classes—those that will not sell below 1.50c. and those whose concessions from this figure have been \$1 to \$2 per ton on exceptional business. Some check is noted to recent contracting for oil storage tanks, and oil well pipe feels the effect of the decline in crude oil.

The automobile industry is again under way with a fair production after the holidays. The Ford schedule for January is 50,000 cars, or something over half its maximum.

Large size structural steel awards of the week will require 8000 tons of steel, while fresh projects call for 9000 tons. On foreign account 2700 tons of steel for pipe lines in Formosa has been placed in the United States and over 9000 tons of material for bridges and transmission towers, also for the Far East, is likely to come to domestic mills.

An order from Japan for 13,000 tons of rails, taken at somewhat under \$47 c.i.f., Japanese port, is conspicuous. More rails will be wanted in the Orient, but it is questioned that the 1921 record of 100,000 tons of sheets shipped from this country to Japan can be duplicated this year.

Nearly half the country's total of 2,200,000 tons of steel exports last year was a carry-over from 1920 orders. There is nothing like that to help out in 1922, yet a gradual increase in exports is expected, partly on the score of a world consumption of steel last year only about half the 75,000,000 tons of 1913.

Radiator companies again have been the principal buyers of pig iron and a considerable amount, including 5500 tons placed with a Buffalo company, has been taken. But the buying even for radiator works, which have had a good operation for months, has been conservative and represents only a small part of what has been placed in other years. Birmingham iron at \$16.50 can be sold on the Pacific Coast at a little more than \$30, or very nearly the price of Belgian iron.

Many foundries are figuring on the cast iron segments for the New Jersey and New York vehicular tunnel, which will require somewhat more than 100,000 tons. Bids will be opened Feb. 7. As the delivery of the segments will extend over nearly two years, furnaces are slow to quote on pig iron.

Pittsburgh

PITTSBURGH, Jan. 10.

The new year thus far has failed to develop any pronounced departure on the part of consumers of iron and steel from their policy of meeting only their actual requirements. Business has not developed to any extent since the holidays. This does not cause disappointment except possibly to a very few. It was pretty well understood that the taking of inventories hardly would be completed before the middle of January, and this finds some confirmation in reports that in a general way inventories are not more than 60 per cent completed. Opinions regarding 1922 business do not vary widely. In most quarters the belief is that pending freight rate and railroad labor wage revisions, the liquidation of coal prices and mine labor charges and the bringing of building trades wage rates more nearly in alignment with those in other crafts, there can be no very long sustained periods of activity, and due recognition is given the fact that these matters cannot be satisfactorily settled overnight. Some put the date of a definitely upward swing in the demand as far off as next September, while there are some who feel that it will be 1923 before there is a return to healthy trade conditions.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 10, 1922	Jan. 3, 1922	Dec. 13, 1921	Jan. 11, 1921
No. 2X, Philadelphia...	\$21.34	\$21.34	\$22.26	\$33.25
No. 2, Valley furnace...	19.50	19.50	20.50	33.00
No. 2, Southern, Cin'ti...	21.00	21.00	22.00	35.50
No. 2, Birmingham, Ala...	16.50	16.50	17.50	32.00
No. 2 foundry, Chicago...	19.00	19.00	20.00	32.00
Basic, del'd, eastern Pa...	20.25	20.25	21.00	33.86
Basic, Valley furnace...	18.25	18.25	19.00	30.00
Bessemer, Pittsburgh...	21.46	21.96	21.96	33.96
Malleable, Chicago...	19.00	19.00	20.00	32.50
Malleable, Valley...	19.50	19.50	20.00	32.00
Gray forge, Pittsburgh...	20.96	20.96	21.46	33.96
L. S. charcoal, Chicago...	31.50	31.50	31.50	40.50
Ferromanganese, del'd...	60.00	60.00	60.00	100.00

Rails, Billets, etc., Per Gross Ton:	Jan. 10, 1922	Jan. 3, 1922	Dec. 13, 1921	Jan. 11, 1921
O.-h. rails, heavy, at mill...	\$10.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh...	28.00	28.00	29.00	42.50
O.-h. billets, Pittsburgh...	28.00	28.00	29.00	42.50
O.-h. sheet bars, P'gh...	29.00	29.00	30.00	47.00
Forging billets, base, P'gh...	32.00	32.00	32.00	48.50
O.-h. billets, Phila...	33.74	33.74	34.74	49.24
Wire rods, Pittsburgh...	36.00	36.00	38.00	57.00
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Skelp, gr. steel, P'gh, lb...	1.50	1.50	1.50	2.45
Light rails at mill...	1.45	1.55	1.55	3.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.85	1.85	1.95	2.70
Iron bars, Chicago...	1.60	1.60	1.65	2.68
Steel bars, Pittsburgh...	1.50	1.50	1.50	2.35
Steel bars, Chicago...	1.60	1.60	1.60	2.73
Steel bars, New York...	1.88	1.88	1.88	2.72
Tank plates, Pittsburgh...	1.50	1.50	1.50	2.65
Tank plates, Chicago...	1.60	1.60	1.60	3.03
Tank plates, New York...	1.83	1.83	1.83	3.03
Beams, Pittsburgh...	1.50	1.50	1.50	2.45
Beams, Chicago...	1.60	1.60	1.65	2.83
Beams, New York...	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh...	2.00	2.00	2.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Sulphur, 2.25 to 2.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 10, 1922	Jan. 3, 1922	Dec. 13, 1921	Jan. 11, 1921
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.70
Sheets, blue an't'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh...	2.50	2.50	2.75	3.25
Plain wire, Pittsburgh...	2.25	2.25	2.50	3.25
Barbed wire, galv., P'gh...	3.15	3.15	3.40	4.10
Tin plate, 100-lb. box, P'gh	\$1.75	\$4.75	\$4.65	\$7.00

Old Material, Per Gross Ton:	Jan. 10, 1922	Jan. 3, 1922	Dec. 13, 1921	Jan. 11, 1921
Curwheels, Chicago...	\$15.50	\$15.50	\$16.00	\$21.00
Curwheels, Philadelphia...	16.50	16.50	16.50	25.00
Heavy steel scrap, P'gh...	14.50	14.50	14.00	15.00
Heavy steel scrap, Phila...	11.50	11.50	11.50	14.50
Heavy steel scrap, Ch'go...	11.50	11.50	11.00	15.00
No. 1 cast, Pittsburgh...	16.25	16.25	16.00	25.00
No. 1 cast, Philadelphia...	16.50	16.50	16.50	22.50
No. 1 cast, Ch'go (net ton)	13.00	12.50	12.50	17.00
No. 1 R.R. wrot, Phila...	14.50	14.50	14.50	20.00
No. 1 R.R. wrot, Ch'go (net)	10.50	10.50	10.50	13.50

Coke, Connellsville, Per Net Ton at Oven:	Jan. 10, 1922	Jan. 3, 1922	Dec. 13, 1921	Jan. 11, 1921
Fernace coke, prompt...	\$2.45	\$2.75	\$2.75	\$5.00
Foundry coke, prompt...	3.75	3.75	3.75	6.50

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.87 1/2	13.87 1/2	13.75	13.25
Electrolytic copper, refinery	13.62 1/2	13.62 1/2	13.50	13.00
Zinc, St. Louis...	4.77 1/2	4.82 1/2	4.85	5.50
Zinc, New York...	5.12 1/2	5.17 1/2	5.20	6.00
Lead, St. Louis...	4.40	4.40	4.40	4.85
Lead, New York...	4.70	4.70	4.70	5.00
Tin (Strait), New York...	32.12 1/2	32.75	32.75	38.75
Antimony (Asiatic), N. Y.	4.50	4.50	4.50	5.20

Composite Price, Jan. 10, 1922, Finished Steel, 2.062c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Jan. 3, 1922, 2.062c. Dec. 13, 1921, 2.135c. Jan. 11, 1921, 3.059c. 10-year pre-war average, 1.684c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, Jan. 10, 1922, Pig Iron, \$18.60 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Jan. 3, 1922, \$18.60 Dec. 13, 1921, 19.46 Jan. 11, 1921, 31.21 10-year pre-war average, 15.72
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The week under review has brought no particular change in prices. Frequent intimations that less than 1.50c., Pittsburgh, has been done on plates are not disputed by producers here, but they assert that the lower prices are Pittsburgh equivalents rather than prices made by the Pittsburgh mills. The tendency of mills outside the Pittsburgh district to quote on an f.o.b. mill basis still is pronounced and unusually sales by these mills figure back to less than the prices quoted by Pittsburgh producers. On the whole, it must be said that as far as business in this district is concerned, there is more resistance to the effort to put prices down than was the case even as recently as last month.

The week likewise has been productive of little or no change in mill operations in this and nearby districts. The Pittsburgh Steel Co. has started up some finishing capacity and the Allegheny Steel Co. has put on some steel making units preparatory to starting up some sheet mills next week. The Carnegie Steel Co., on the other hand, is running at a lower rate this week than it did last week. There has been no change to speak of in the Valley and Wheeling districts. The monthly unfilled tonnage statement of the Steel Corporation showing an increase in its obligations of about 17,000 tons, occasions little surprise since December was the last month of the quarter and a

good many orders for rails and tin plate went upon its books during that month.

The pig iron market is showing a little more life, but actual business still is unsatisfactory as regards both volume and prices. Old material prices show considerable firmness in the lighter grades of open-hearth material. So many of the blast furnaces now active are protected against fuel requirements that there is practically no market whatever in prompt coke.

Pig Iron.—Inquiry for foundry iron is rather more active than it has been and sales reach a somewhat heavier total than before in several weeks. The National Radiator Co., which recently put out an inquiry for 1500 tons for shipment in equal quantities to its three plants, is understood to have closed for the 500 tons for its Johnstown works, at \$19.50 for No. 2 grade, at a western Pennsylvania furnace. A Pittsburgh foundry interest has taken 500 tons of No. 2 iron at \$19.50, Valley furnace. There is before sellers an inquiry for 2000 tons of foundry or malleable iron from a maker of fittings, while local concerns which are preparing to bid on a portion of the requirements for the new Manhattan tunnel are seeking protection on 5000 tons of foundry grade. There is also an inquiry for 500 tons of No. 2 foundry from a Pittsburgh melter. The common price both on in-

quiries for and sales of No. 2 foundry iron has been \$19.50 at furnace. It is reported, however, that Lake furnaces have gone as low as \$19, Valley furnace, on local business. The most interesting piece of business in steel making iron was a sale of 1500 tons of Bessemer to an Ohio ingot mold manufacturer at \$19.50, Valley furnace. This is a drop of 50c. per ton from the former nominal quotation on this grade. A Pittsburgh district sheet maker has inquired for 500 tons of basic for early delivery, against which the common quotation has been \$18.25, Valley furnace. Talk is heard of \$18 for Valley basic, but a sale at that price is yet to be reported. Follansbee Brothers Co. recently closed for 1000 tons of basic, the business going to a nearby maker at about \$19.75, delivered, Follansbee, West Virginia.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton.

Basic	\$18.25
Bessemer	19.50
Gray forge	\$19.00 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	19.50 to 20.00

Ferroalloys.—Interest in the market on the part of consumers is extremely limited, and in the absence of important transactions, it is impossible to make any material change in prices. Makers of 50 per cent ferrosilicon still are quoting \$60 furnace, freight allowed, or more, but the effect of business done a few weeks ago at \$54 to \$55 still lingers and it is difficult to get consumers' ideas up to even \$60. The common quotation on 80 per cent ferromanganese is \$58.35, Atlantic seaboard, this price applying to domestic, English and German material. As far as this immediate district is concerned, that price is unobtainable since it means a delivered price of \$1 to \$2 per ton above the price of the Steel Corporation subsidiary making and offering this material. The inquiry for 300 tons of 15 to 19 per cent spiegeleisen by a central Ohio steel maker, referred to in these columns a week ago, has been closed on a basis of \$24 furnace, or \$27.60 delivered. Interest in Bessemer ferrosilicon and silveries in this district is very limited. This is partly due to the fact that the steel foundries are getting a good deal of Government material in their scrap purchases, and his steel runs so high in silicon as to obviate the necessity of using the usual amount of high silicon iron.

We quote 78 to 82 per cent domestic ferromanganese at \$59 to \$63.67 delivered, 78 to 82 per cent foreign ferromanganese, \$58.35, c.i.f. Atlantic seaboard; German, for 76 to 80 per cent, \$54, seaboard. Average 20 per cent spiegeleisen at \$30 delivered, Pittsburgh or Valleys; 16 to 18 per cent spiegeleisen, \$26 to \$30 delivered Pittsburgh; 50 per cent ferrosilicon, domestic, \$54 to \$57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.80; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 6 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market still is a very narrow affair, with little business being placed and prices still rather indefinite. These conditions are in keeping with those existing in finished products. Mills which do not make their own steel are not heavily booked and the common impression is that the demand for sheets, plates and merchant mill products, for the next few months at least, will be much as it has been during the past few months, namely, the covering of actual needs. The common asking price on billets, sheet bars and slabs is \$30, but there is reason to suppose that that price can be shaded at least \$1 on sheet bars and that a sizable inquiry for 4-in. billets would develop a price as low as \$28.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$29; 2 x 2 in. billets, \$29 to \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$29 to \$30; forging billets, ordinary carbons, \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—There is a fairly good demand from wire manufacturers and some export business, but inquiries from other sources are few and small. The quotations of all makers is \$38 Pittsburgh or Youngstown, for the base size of soft rods, but this price refers only to retail lots, and on quantity tonnages \$36 to \$37 is the range. Prices are given on page 183.

Steel Skelp.—The usual quotation on steel pipe skelp is 1.50c., but there is hardly enough demand to provide a test of this price. On steel boiler tube skelp, most makers are quoting 1.65c.

Steel Rails.—No improvement is noted in the demand for light sections and prices are largely nominal. On rails rolled from new steel, makers generally are asking 1.60c. base, but find it almost impossible to obtain that figure because of rather keen competition for passing business, notably on the part of makers of re-rolled rails, who are said to have gone as low as 1.45c. mill, to obtain orders. Specifications against orders for standard rails are not especially heavy as yet.

We quote 25 to 45-lb. sections, rolled from new steel, 1.45c. to 1.50c. base; rolled from old rails, 1.50c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Wire Products.—The impression is so widespread that present prices will not be maintained, that buyers are extremely cautious, and the common report is that there is room for much improvement in business. Inventories hardly are more than half completed and this also is a factor in the lack of activity. It is too early for any considerable amount of business from the agricultural districts and until what is regarded as a deplorable financial situation among the farmers is corrected, there is not much hope of normal demands from this source. Manufacturers here reiterate that there is no shading of the Dec. 21 prices of \$2.50 base per keg for nails and \$2.25 base per 100 lb. on plain wire.

We quote wire nails at \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Iron and Steel Bars.—Demand is exceedingly light and prices for that reason are untested and nominal. All makers are quoting both mild and carbon bars at 1.50c. On the latter, however, there is such sharp competition from rerolled bars, which have gone as low as 1.35c., that it is rather difficult to effect sales at the full quotation. Activity also is lacking in iron bars. Bars made from pig iron are quoted at 4c. base, with those containing scrap ranging down to 2c.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—There has been no appreciable increase either in orders or specifications, probably because most consumers still have supplies on hand or due them at prices \$5 per ton below those now quoted, and which are being adhered to with remarkable tenacity. In the passing business, the American Sheet & Tin Plate Co. seems to be faring better than the independents, as is evident from the fact that it is operating more than 70 per cent of its mills, against a rate of only slightly more than 30 per cent by independent manufacturers. The effort to break prices has not ceased, but continues to be unsuccessful. It is commented upon that 2.25c. base has become fairly easy to obtain on the lighter gages of blue annealed sheets, but the heavier gages still are being sold on the plate base which, with the latter product at 1.50c., would mean slightly less than 2c. for heavy blue annealed stock. Prices are given on page 183.

Tin Plate.—The most important development of the past week is that there has been a considerable lessening in the tendency to shade the regular price of \$4.75 per base box on standard coke. This is probably explained by a little better distribution of the business than was the case recently, and fewer mills now feel the need of making concessions to secure orders. The movement of tin plate against orders is unusually good for this time of the year, and mill operations rarely have been as heavy at this season as they are this year. The American Sheet & Tin Plate Co. is operating more than 90 per cent, while among the independents full operations are noted by Standard Tin Plate Co., Canonsburg, and 80 per cent operations or better, by the Jones & Laughlin Steel Co. and Weirton Steel Co. The McKeesport Tin Plate Co., the Wheeling Steel & Iron Co. and the Washington Tin Plate Co. are idle, but the first named is expected

to resume operations next week and the Wheeling Steel & Iron Co. is making an effort to start up its Yorkville, Ohio, plant.

We quote standard production coke tin plate at \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—Business still is of very moderate proportions, and not especially well distributed. There is some buying of shafting by oil well supply houses, while the locomotive companies also are taking on fair sized tonnages and the demand from makers of motors has been better in the past few weeks than before in some time. The big outlets for screw stock, the automotive industry and the machine tool manufacturers, however, still are largely closed. The going price on the bulk of the business in cold-finished bars and shafting, is 2c. base, Pittsburgh, but sales have been made both below and above that figure. The full range of prices is from 1.85c. to 2.25c. base. Ground shafting is unchanged at \$2.50 base per 100-lb. f.o.b. Mill.

Hoops and Bands.—Prices still are very poorly defined and because of the uncertainty as to where they will ultimately land, business is extremely small. There is no question but that band steel can be bought as low as 1.75c., although the asking price of regular makers is 2c. That price also is quoted on hoops, but the \$10 per ton differential which that price means over the current price for steel bars, is proving something of an obstacle to business, since even adding 50 per cent to the pre-war differential to cover the increased cost of labor and handling charges still would leave the margin wide as compared with what it was before the war.

Hot-rolled and Cold-rolled Strips.—There has been little, if any, increase in actual business, but because of the common belief that stocks in consuming hands are pretty well liquidated, the outlook is considered good for the more active market in the next 45 or 60 days. The going price on hot-rolled strips is 2c. base, Pittsburgh, for carload lots, but there are intimations that large buyers, as usual, are getting some preferential price treatment. All makers now are down to a base of 3.50c. Pittsburgh, for cold-rolled strips, and there is no important shading of that price.

Nuts and Bolts.—Business with makers in this district shows no appreciable improvement and business in consuming industries is so slack that hopes of early improvement are not especially strong. Since present quotations fully discount present prices of raw material, there is not much disposition to shade them. It is not so much a question of price as of needs that hinders business. Discounts are given on page 183.

Rivets.—Recent reduction in prices by the leading Cleveland maker has been followed by makers in this district. Business is no better at the new quotations than it was at the old ones. Prices and discounts are given on page 183.

Spikes.—The market is showing a little more life on standard spikes than it did recently. The Norfolk & Western Railway recently closed with a Pittsburgh maker for 6000 kegs at around \$2.25 base, per 100 lb. while new inquiries include 2000 kegs for the Southern Pacific Co., and 1000 kegs for the Missouri Pacific Railroad. It is probable that Western mills will be awarded these orders. Small spikes are in light demand. Prices are unchanged, but the market is steady rather than firm. Prices are given on page 183.

Structural Material.—Fabricating interests in this district note some increase in inquiries, but actual awards are few and not much tonnage is involved. The Jones & Laughlin Steel Co. will furnish 700 or 800 tons of concrete bars for the Scottish Rite Cathedral. St. Louis, and also 400 tons of structural material for the new Langley School, Pittsburgh. Plain material is inactive, but fairly steady at 1.50c., Pittsburgh. Prices are given on page 183.

Plates.—Local mills are experiencing a very slow demand. Railroad equipment companies in this district do not seem to be faring nearly as well on orders as those in other parts of the country, and the recent

downward reaction in oil prices has put a quietus upon the demand for storage tanks.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—The South reports building activity the coming spring and building projects in the New York district also point to some good sized future orders for merchant pipe from that center. The drop in oil prices, which now amounts to 75c. per barrel in Pennsylvania crude from the recent high point, is having its effect upon the demand for oil well pipe, but there are two promising inquiries for line pipe out of the natural gas field in Louisiana. One of these is for 400 miles and the other is for 250 miles. There is good observance of the Dec. 16 steel pipe card and the makers of wrought iron pipe are holding to their last card, dated Sept. 1, last year. Discounts are given on page 183.

Boiler Tubes.—Demand is steady rather than active. All makers of lap weld steel boiler tubes now are giving a supplementary discount of 5 per cent in addition to the regular card discount on carload lots. There has been no change in charcoal iron tubes. Discounts are given on page 183.

Coke and Coal.—The spot market in furnace coke has practically disappeared since all furnaces in this and nearby districts dependent on outside sources for fuel supplies now are covered by contract. As nearly as can be determined from the limited spot business in progress, the market is quotable at the recent range of \$2.75 to \$3 per net ton oven. Spot foundry coke is available at the usual premium of \$1 per ton over furnace grade. The 1921 production of Connellsville coke is estimated by the Connellsville *Courier* to have been 3,572,417 net tons, as compared with 10,738,227 tons, in 1920.

Steel Chain.—Effective Jan. 4, leading makers of steel chain issued a new price list reducing base price from \$5.90 to \$5.50 per 100-lb. There has been a slight revision on the size extras in the new card, that of 3/16-in. to ¼-in., having been increased 10c. per 100-lb.; on 5/16-in. to ¾-in. inclusive 15c. per 100-lb.; on 9/16-in. 25c. per 100-lb. and on 11/16-in. to 5/8-in. 10c. per 100-lb. The new list reduces the price on wagon chains from 25c. to \$1 per 100-lb. and the smaller sizes of loading chain have been cut \$2 per 100-lb. for ¼-in. and 9/16-in., and \$1 per 100-lb. for 5/16-in. There has been an increase in the discount on cold shuts, slip and grab hooks, all kinds of bright chain and cow ties of 5 per cent.

Old Material.—Recent sales of machine shop turnings have been at from \$9.50 to \$10; of shoveling turnings at \$10.75 to \$11 and the same price has been paid for cast iron borings. There is a pretty good market for compressed sheets at \$11.75 and for hand bundled sheets at \$1 per ton less.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follanshee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$14.50 to \$15.00
No. 1 cast, cupola size.....	16.25 to 16.75
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel.....	11.75 to 12.00
Bundled sheets, sides and ends.....	10.50 to 11.00
Railroad knuckles and couplers.....	15.00 to 15.50
Railroad coil and leaf springs.....	15.00 to 15.50
Low phosphorus standard bloom and billet ends.....	17.50 to 18.00
Low phosphorus plates and other grades.....	17.00 to 17.50
Railroad malleable.....	12.50 to 13.00
Iron car axles.....	24.00 to 25.00
Locomotive axles, steel.....	22.00 to 23.00
Steel car axles.....	15.00 to 15.50
Cast iron wheels.....	15.00 to 15.50
Roller steel wheels.....	15.00 to 15.50
Machine shop turnings.....	9.50 to 10.00
Sheet bar crop ends.....	14.50 to 15.00
Heavy steel axle turnings.....	11.50 to 12.00
Short shoveling turnings.....	10.75 to 11.00
Heavy breakable cast.....	14.00 to 14.50
Stove plate.....	13.00 to 13.50
Cast iron borings.....	10.75 to 11.00
No. 1 railroad wrought.....	11.50 to 12.00

Chicago

CHICAGO, Jan. 9.

The placing of large orders for railroad cars and the probability of further important purchases within the next week or two have given the iron and steel market an undertone of confidence. Although actual bookings by mills and furnaces during the first week of the new year are not appreciably larger than those of the closing week of 1921, the car buying now under way is bound to put considerable tonnage on the books of producers. Another source of encouragement is the failure of the general strike of the local building trades unions to materialize. Scheduled for to-day, the walkout was prevented by a last-minute refusal of three crafts to follow the dictates of the Building Trades Council.

One discouraging recent development is the rumored discovery of salt water in the new Mexia, Tex., oil fields which has had the effect of halting negotiations on storage tanks now on inquiry. The report has not been verified, however, and it is hoped that it will prove to be merely a bear story. Demand for iron and steel from miscellaneous sources is still very light. The expectation that jobbers would replenish their stocks after the first of the year has not yet been fulfilled.

Mill operations in this district have declined. The Illinois Steel Co. has 10 active blast furnaces, or one less than a week ago, and is producing steel at the rate of 28½ per cent of ingot capacity. The Inland Steel Co. continues to operate two blast furnaces, but has reduced its steel output to a 35 to 40 per cent basis. It has eight open-hearth furnaces running and all of its sheet mills; its continuous merchant and 24-inch structural mills are active.

Pig Iron.—Buying is light and new inquiries are few. With few orders of size being placed, the price situation remains largely untested. That the market is none too steady, however, is evidenced by the fact that concessions have been made in competitive territory. For Indianapolis delivery, 350 tons of malleable was bought at a price which figures back to less than \$18.75, base Chicago furnace. In the Chicago district proper, \$19, base local furnace, appears to be the minimum. A number of carload sales of Southern foundry have been made at \$16.50 base, Birmingham, and it is said that \$16 could be done on tonnage. Little activity is reported in charcoal, low phosphorus or silvery. While Jackson County producers continue to adhere to \$29.50, furnace, for 8 per cent silvery, resale and electrolytic material is being offered for less.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago. . .	\$31.50
Northern coke, No. 1, sil. 2.25 to 2.75. . .	\$19.50 to 20.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25. . .	19.00 to 19.50
Northern high phos. . .	19.00 to 19.50
Southern foundry, sil. 1.75 to 2.25. . .	23.17
Malleable, not over 2.25 sil. . .	19.00 to 19.50
Basic . . .	19.00 to 19.50
Low phos., Valley furnace, sil. 1. to 2 per cent copper free. . .	33.00
Silvery, sil. 8 per cent. . .	32.82 to 34.82

Ferroalloys.—A local melter has closed for 100 tons of 15 per cent ferrosilicon at slightly under \$33 delivered and for a carload of spiegeleisen at \$31.50 delivered. The spiegeleisen was brought from a furnace with a freight of \$6.50 and it is understood that this producer has now exhausted its stocks of that material.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$60, delivered; spiegeleisen, 18 to 22 per cent, \$36 to \$37, delivered.

Railroad Equipment.—The Union Pacific has placed orders for 4500 cars as following: One thousand automobile cars to General American Car Co., 500 automobile cars to Standard Steel Car Co., 1000 box cars each to Mount Vernon Car Mfg. Co. and the American Car & Foundry Co.; and 1000 all-steel automobile cars to the Pullman Co. The same road is expected to

place orders for 2000 additional cars. The Illinois Central to-day placed orders for 2000 gondola cars distributed as follows: Five hundred 46-ft. cars to the American Car & Foundry Co., 700 41-ft. cars to Haskell & Barker Car Co., 400 41-ft. cars each to Western Steel Car & Foundry Co. and Standard Steel Car Co. The board of directors of the Burlington has authorized the purchase of 7300 freight cars and orders are expected to be placed in the near future. The Great Northern will probably take action on its car inquiry next week.

Rails and Track Supplies.—No new rail orders are reported in this territory and the Gary mill is temporarily idle. While this is not the season for purchases of track supplies by roads of this locality, some attractive orders are being closed by lines passing through the South. The Illinois Central has bought 500,000 iron tie plates and the Louisville & Nashville, which recently ordered 50,000 tons of rails, is now in the market for necessary angle bars, bolts and spikes.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.60c. to 1.65c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.875c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bars.—Jobbers have bought in a moderate way during the past week and some reinforcing tonnage has been placed, but on the whole, demand for mild steel bars in unsatisfactory. Considerable reinforcing steel for road work in Iowa and Illinois has been placed for March delivery and more of this business is pending. Numerous building projects requiring reinforcing are being figured on, one of the largest being a structure in this city for the Continental Insurance Co. This calls for 1200 tons and the Leonard Construction Co., Chicago, prepared the plans and has the contract for the excavation work. Bids on the 5000 tons of reinforcing for the sedimentation and aeration tanks at the Jones Island Sewage Disposal plant, Milwaukee, will be taken on Feb. 3. Bids on the warehouse for the Belknap Hardware & Mfg. Co., Louisville, Ky., will be taken Jan. 30. Other pending business includes 800 tons for Minnesota road work, on which bids will be taken at St. Paul, and 350 tons for a grain elevator at Galveston, Tex. The Kansas City Bolt & Nut Co. has the contract for 1000 tons for a dam at Wichita Falls, Tex. The Jones & Laughlin Steel Co. has been awarded 250 tons for a Scottish Rite Cathedral at St. Louis. The Truscon Steel Co. has received an order for 100 tons for road work near Blue Island, Ill. Bar iron mills report bookings somewhat improved, although still far from satisfactory. Bar iron is generally quoted at a flat price of 1.60c., Chicago.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.13c.

Wire Products.—Jobbers are buying somewhat more freely, but demand is still light. The new prices are holding so far as finished products are concerned, but weakness has appeared in wire rods, \$37 a ton being a fairly common quotation while as low as \$35 a ton is said to have been named. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 183.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.65 per keg.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Sheets.—Demand from domestic sources remains light, but considerable export business has been taken. One local mill has booked 4600 tons for Japan within the past week. Prices are firm.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 88c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—While new bookings during the first week of the new year were disappointing, mills are encouraged because of the prospects of heavy car buying by the railroads. The Union Pacific has placed orders for 4500 freight cars and large purchases by the Burlington and Illinois Central will be made shortly. The reported appearance of salt water in the new Mexia, Tex., oil fields has had the effect of halting negotiations on storage tanks on inquiry. The price situation is substantially unchanged. It is probable that car builders participating in the Union Pacific order will be able to place their steel requirements at 1.50c., Chicago, or \$2 under the general market.

The ruling mill quotations range from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Bolts and Nuts.—Buying is at a minimum and discounts are weak. For nominal mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 183.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to 3/4 x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to 3/4 x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off; blank nuts, \$4 off; coach or lag screws, gimlet points, square heads, 65 and 10 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. is low bidder on 900 tons for Akron, Ohio, and the National Cast Iron Pipe Co. submitted the low figure on 80 tons for Woodward, Okla. Ellis, Kan., let 269 tons to a contractor, who will sublet. Chicago takes bids Jan. 17 on 1353 tons and Milwaukee is expected to issue an inquiry soon for a round tonnage of 54-in. pipe. The price situation is unchanged except that occasional shading is reported.

We quote per net ton f.o.b. Chicago as follows: Water pipe 4-in., \$47.10 to \$48.10, 6-in. and above, \$43.10 to \$44.10, class A and gas pipe, \$4 extra.

Old Material.—Except for moderate purchases of wrought by two local iron mills and a few orders for cast and malleable from foundries, there was no consumptive buying to speak of during the first week of 1922. Speculative buying by dealers has also dropped off. Prices remain practically stationary. Re-rolling rails have declined 50c., while No. 1 cast has advanced a similar amount, but otherwise no changes have been made. Railroad offerings include the Union Pacific, 3000 tons; the Wabash, 1000 tons; the Northern Pacific, 750 tons; and the Southern, 10,000 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Relaying rails	23.00 to 27.50
Cast iron car wheels	13.00 to 13.50
Roller or forged steel car wheels	13.00 to 13.50
Steel rails, re-rolling	12.00 to 12.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	13.00 to 13.50
Iron car axles	19.00 to 19.50
Steel car axles	12.50 to 13.00
No. 1 busheling	8.25 to 8.75
No. 2 busheling	6.00 to 6.50
Cut force	10.25 to 10.75
Pipes and flues	7.00 to 7.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	12.50 to 13.00
No. 1 machinery cast	13.00 to 13.50
No. 1 railroad cast	12.50 to 13.00
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Structural Material.—With strikes breaking out again in the local building trades, the construction outlook in Chicago is none too bright. A strike called to-day by local craftsmen constitutes a repudiation of their agreement to abide by the Landis award of last September and gives the contractors an opportunity to introduce the open shop, which is regarded in many quarters as the only solution of an exceedingly unsatisfactory situation. Mill prices remain unchanged. Few

fabricating awards were made during the first week of the new year. Recent lettings include:

Cadillac Foundry Co., annealing foundry and service buildings, Cadillac, Mich., 301 tons, to Indiana Bridge Co. Melrose, Wis., bridge, 276 tons, to Worden-Allen Co. Chicago. Wilmington & Franklin Coal Co., coal tipple, West Frankfort, Ill., 166 tons, to unnamed fabricator.

Pending business includes: Municipal auditorium and market house, Memphis, Tenn., 2169 tons of structural steel and 300 tons of reinforcing, James Alexander Construction Co., Memphis, low bidder on general contract.

The mill quotation on plain material ranges from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Warehouse Prices.—Local jobbers have made reductions of \$3 a ton on plates, shapes, bars, shafting and hoops and bands. The new prices are shown under the paragraphs covering plates, structural material and bars.

St. Louis

ST. LOUIS, Jan. 10.

Pig Iron.—The first week of the new year brought forth an improvement in the pig iron market in inquiries and sales. Stocks in hands of melters are said to be down to the point where they can do no more business unless they buy something, and when purchases are made these days there is keen interest on the part of melters to have shipment and delivery expedited. The biggest sale of the week was 500 tons of foundry to a radiator company; a Quincy, Ill., implement manufacturer bought 200 tons of foundry iron; a local melter bought 100 tons of 3.25 to 3.75 silicon, with small lots to local melters. A few scattering sales were made of charcoal iron. Inquiries are from a carload to 150 tons. One inquiry is reported for 50 tons of 50 per cent Bessemer ferrosilicon. The market on Northern iron is \$19, Chicago, although offers of considerable tonnage would bring forth a lower quotation, while Southern iron is at \$16.50, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	\$21.88
Northern malleable, sil. 1.75 to 2.25	21.88
Basic	21.88
Southern foundry, sil. 1.75 to 2.25	22.41

Finished Iron and Steel.—The only business of consequence for structural material placed for some time for use in St. Louis was 240 tons of reinforcing bars, which went to the Jones & Laughlin Steel Co., Pittsburgh, at a delivered price. The structural steel, 3000 tons went to the American Bridge Co. last October. Word has been received here that the awarding of the contract for the Belknap Warehouse, a 14-story building at Louisville, Ky., has been postponed until the last of the month. The job involves about 800 tons of bars and 800 tons of structural steel. Graham, Anderson, Probst & White, Chicago, are the architects. Barnett, Haynes & Barnett, St. Louis, are architects for a hotel in Memphis, plans for which are completed, but work has been delayed because of business conditions. The tonnage is approximately 850. Nearly all structural work here is being held up until the wage scale is adjusted. Nothing of consequence has come from the railroads thus far in 1922. It is understood by steel men here that the Prairie Oil & Gas Co. is in the market for 18 55,000-bbl. steel storage tanks, involving about 2500 tons of plates. Warehouse prices on bars, plates, structural shapes, bands and hoops are off 0.15c. per lb.

For stock out of warehouse we quote: Soft steel bars, 2.62 1/2c. per lb.; iron bars, 2.62 1/2c.; structural shapes, 2.72 1/2c.; tank plates, 2.72 1/2c.; No. 10 blue annealed sheets, 3.47 1/2c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52 1/4 per 100 lb.; boiler rivets, \$3.62 1/4; tank rivets, 7/16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, \$4; and tapped, \$3.75 off list.

Coke.—The biggest prospect in coke is an inquiry for 600 tons for January and February shipment to California. A few orders were received for carloads and up to 100 tons. The coke market began the year with

a little better tendency in the right direction; buyers seemed to think that the market has about reached the bottom. There has been a better movement of domestic coke as the result of colder weather. The market is at \$3.75 to \$4.50 for Connellsville coke, which price is being met by local by-product producers.

Old Material.—The market for old material is inactive as far as purchases by steel mills and rolling mills is concerned, but maintains a fairly firm tone because of the expectation of dealers that the steel mills shortly will increase operations and consequently consumption. Most of the yard dealers have laid down large tonnages of old material in anticipation of better business early this year, although consumers contend that the expected turn for the better has not yet arrived. Railroad offerings are light for a change, the only lists out being the Mobile & Ohio, 850 tons, and the Kansas City Southern, 100 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Old iron rails.....	\$15.00 to	\$15.50
Steel rails, rerolling.....	11.50 to	12.00
Steel rails, less than 3 ft.....	11.50 to	12.00
Relaying rails, standard section.....	23.00 to	28.00
Cast iron car wheels.....	14.00 to	14.50
No. 1 heavy railroad melting steel.....	10.50 to	11.00
No. 1 heavy shoveling steel.....	10.00 to	10.50
Ordinary shoveling steel.....	9.00 to	9.50
Frogs, switches and guards cut apart.....	10.50 to	11.00
Ordinary bundle sheet.....	4.50 to	5.00

Per Net Ton

Heavy axles and tire turnings.....	5.00 to	5.50
Iron angle bars.....	13.50 to	14.00
Steel angle bars.....	9.00 to	9.50
Iron car axles.....	18.00 to	18.50
Steel car axles.....	13.50 to	14.00
Wrought iron arch bars and transoms.....	13.00 to	13.50
No. 1 railroad wrought.....	9.50 to	10.00
No. 2 railroad wrought.....	8.50 to	9.00
Railroad springs.....	11.25 to	11.75
Steel couplers and knuckles.....	11.25 to	11.75
Locomotive tires, 42 in. and over, smooth inside.....	8.00 to	8.50
No. 1 dealers' forge.....	7.00 to	7.50
Cast iron borings.....	5.50 to	6.00
No. 1 bushellings.....	8.50 to	9.00
No. 1 boilers cut in sheets and rings.....	7.00 to	7.50
No. 1 railroad cast.....	13.00 to	13.50
Stove plate and light cast.....	11.50 to	12.00
Railroad malleable.....	9.50 to	10.00
Agricultural malleable.....	9.00 to	9.50
Pipes and flues.....	7.50 to	8.00
Heavy railroad sheet and tank.....	6.00 to	6.50
Light railroad sheet.....	4.50 to	5.00
Railroad grate bars.....	9.50 to	10.00
Machine shop turnings.....	4.50 to	5.00
Country mixed iron.....	6.50 to	7.00
Un-cut railroad mixed.....	7.00 to	7.50
Horseshoes.....	9.50 to	10.00
Railroad brake shoes.....	9.00 to	9.50

Buffalo

BUFFALO, Jan. 9.

Pig Iron.—Exclusive of purchases by radiator interests, sales for the week were about 12,000 tons; the radiator purchases being part of current requirements of 7000 tons. One furnace has filled a portion of this order and the price was lower than \$20, the ruling quotation. Some encouragement is developing out of increased inquiry and while foundries generally are asking for small tonnages in each instance, the outlook is promising. On an Eastern inquiry for 2.75 to 3.25 silicon, a furnace quoted \$21, but was unsuccessful. The New York vehicular tunnel project is more actively interesting Buffalo furnaces and while the actual inquiry has not been issued, it is expected about the middle of February. No contracts have been made for delivery beyond first quarter. Furnace operation is virtually the same; the Donner Steel Co. has one furnace temporarily out of blast.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$20.00 to	\$21.00
No. 2X foundry, 2.25 to 2.75 sil.....	19.50 to	20.50
No. 2 plain, 1.75 to 2.25 sil.....	19.00 to	20.00
Basic.....	20.00 to	21.00
Malleable.....	20.00 to	21.00
Lake Superior charcoal.....		31.75

Finished Iron and Steel.—While improvement in inquiry is felt by most of the selling agencies, it is not regarded in all instances as indicative of a more active demand; rather, it is reflective of a desire to get prices for purposes of computing inventories for tax statements. The leading rail interest has increased operation due to receipt of several orders in addition to the one large order entered several weeks ago. The Buffalo Steel Car Co. has started work on 1000 steel hopper

cars for the Buffalo, Rochester & Pittsburgh Railway. No large structural awards have developed, but a number of small tonnages are engaging the two largest fabricators; one has sufficient tonnage booked to warrant its present basis of operation to continue three months.

Warehouse Business.—Effective Jan. 6, prices on heavy lines were reduced to conform to present mill schedules. Some betterment in the volume of inquiry has appeared since the first of the new year, but it can hardly be said to be a material improvement as yet.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.55c.

Coke.—The market has weakened to the point that best grades are obtainable at \$4.25 f.o.b. ovens. Heating coke is quoted at \$2.75 to \$3.00.

Old Material.—Youngstown and Eastern Pennsylvania buyers have asked for prices on turnings and borings but production is too light to bring forth any great response. Heavy melting steel production is light and with the exception of a few purchases of less than 500 tons by the two mills which have consistently bought, little has developed. The slightest interest in any old material would be quickly followed by a price advance.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$13.00 to	\$14.00
Low phos., 0.04 and under.....	17.00 to	18.00
No. 1 railroad wrought.....	15.00 to	16.00
Car wheels.....	16.50 to	17.50
Machine shop turnings.....	7.50 to	8.00
Cast iron borings.....	7.00 to	8.00
Heavy axle turnings.....	10.50 to	11.50
Grate bars.....	12.00 to	13.00
No. 1 bushelling.....	10.00 to	11.00
Stove plate.....	15.00 to	16.00
Bundled sheet stampings.....	8.00 to	9.00
No. 1 machinery cast.....	17.00 to	18.00
Hydraulic compressed.....	10.50 to	11.50
Railroad malleable.....	13.00 to	14.00

Boston

BOSTON, Jan. 10.

Pig Iron.—Practically all makers of stove parts in this section of the country, as well as some of the heater and a large number of jobbing foundries, up to yesterday, have been closed for cleaning up stock and inventory purposes. Melters naturally have shown little disposition to purchase pig iron until their requirements are more clearly defined. Sales reported this week involve approximately 2000 tons, of which 1400 tons No. 2 plain eastern Pennsylvania, first quarter, was taken by a Bridgeport, Conn., maker of valves at private terms, delivery to be made by barge. Other transactions mostly were car lots, although a Massachusetts foundry took 100 tons Buffalo No. 2X at \$19.50 furnace and a Vermont melter 150 tons No. 2X eastern Pennsylvania at \$21.50 furnace. The last sale was fully 50c. above the lowest price quoted by any other furnace, the market for eastern Pennsylvania iron being \$20 to \$20.50 base in all but this one instance. Buffalo No. 2 plain and No. 2X continue available at \$19. There is not enough being done in Virginia and Alabama irons to establish a market. Most of the large users have covered their first quarter pig iron requirements, consequently furnaces will have to accept more extended datings to secure desirable tonnages. Local brokers report collections as slow.

We quote delivered at common New England points as follows, having added to furnace prices \$4.08 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.66 from Virginia and \$10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75.....	\$24.06 to	\$25.06
East. Penn., silicon 1.75 to 2.25.....	23.56 to	24.56
Buffalo, silicon 2.25 to 2.75.....	24.46 to	25.46
Buffalo, silicon 1.75 to 2.25.....	24.46 to	25.46
Virginia, silicon 2.25 to 2.75.....	29.08 to	30.08
Virginia, silicon 1.75 to 2.25.....	28.58 to	29.58
Alabama, silicon 2.25 to 2.75.....		28.16
Alabama, silicon 1.75 to 2.25.....		27.66

Finished Material.—Structural steel is the only finished material showing any degree of activity in this market. Since Jan. 1 a considerable aggregate tonnage of possibilities has developed, including 8000 tons for a new Boston hotel, 2400 to 2500 tons for the Chamber of Commerce, and numerous smaller amounts. The

New England Structural Co. is awarded 1200 tons for a local bank addition, while a Providence, R. I., fabricator is awarded 350 tons for a textile mill and 300 tons for a dry goods store. Plain material is firm at 1.50c. or \$30 per net ton f.o.b. Pittsburgh. Buying of plates continues in small tonnages at 1.50c. and occasionally 1.55c. and 1.60c. The demand for bars is limited. The New York, Ontario & Western Railroad, a subsidiary of the New York, New Haven & Hartford Railroad Co., has placed an order for 30 all-steel cars with the Osgood-Bradley Car Co., Worcester, Mass., involving \$600,000. Local warehouses report some improvement in business since Jan. 1, but say consumption is far from active.

Jobbers now quote: Soft steel bars, \$2.71½ per 100 lb. base; flats, \$3.21½; concrete bars, \$2.20 to \$2.71½; tire steel, \$4 to \$4.40; spring steel, open hearth, \$4.50; crucible, \$11.50; steel bands, \$3.31½ to \$3.78; steel hoops, \$3.31½; toe calk steel, \$5; cold rolled steel, \$3.55 to \$4.05; structural steel, \$2.71½; plates, \$2.81½ to \$2.99; No. 10 blue annealed sheets, \$3.78; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50; refined iron, \$2.71½; best refined, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50 base.

Coke.—Little of interest has developed in the local by-product foundry coke market since a week ago, when both the New England Coal & Coke Co. and the Providence Gas Co. reduced their price from \$10.66 to \$10.40 delivered where the local freight does not exceed \$3.40. This reduction was based on values here being somewhat out of line with those quoted for Connellsville foundry cokes. Most of the large New England consumers of foundry coke have covered their first half requirements at price ruling date of shipment, consequently new bookings in each individual case involve small tonnages. The Providence Gas Co. is delivering foundry coke as fast as it is made, but the New England Coal & Coke Co. reports limited shipping instructions, with indications of a betterment by Jan. 15.

Old Material.—The strength of cast iron borings is the outstanding feature. Prices for same are easily \$1 higher, due to a scarcity of material and efforts by dealers to cover on old contracts. Otherwise little has developed since Jan. 1, except, perhaps, some shading of quotations on railroad and yard wrought, street car axles, shafting and car wheels, due to the lack of business rather than any pressure to sell. A Massachusetts manufacturer is offering a fair tonnage of shafting at 2½c. Heavy melting steel, if anything, is firmer, in anticipation of better business before the close of the month by dealers. Two cars of special steel, grading better than ordinary lots of heavy melting, sold this week to a Massachusetts foundry at \$12 delivered. Some brokers are still endeavoring to secure \$19 delivered for No. 1 machinery cast, but New England foundries display little interest at that price inasmuch as they can secure all material necessary on a basis of \$17.50 to \$18.50 delivered, either in large or small tonnages.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$17.50 to \$18.50
No. 2 machinery cast.....	15.50 to 16.50
Steve plate.....	15.00
Railroad malleable.....	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$8.00 to \$8.25
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought.....	9.50 to 10.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	7.00 to 7.25
Machine shop turnings.....	3.50 to 4.00
Cast iron borings, rolling mill.....	7.00 to 7.50
Cast iron borings, chemical.....	7.50 to 8.00
Blast furnace borings and turnings.....	3.50 to 3.75
Forged scrap and bundled skeleton.....	4.50 to 5.00
Street car axles and shafting.....	10.50 to 11.00
Car wheels.....	11.50 to 12.00
Rerolling rails.....	10.00 to 10.50

A technical session covering the subject of stokers, will be held Saturday evening, Feb. 4, at the Hotel Chatham, Pittsburgh, under the auspices of the Combustion Engineering Section of the Association of Iron and Steel Electrical Engineers. The following manufacturers have signified their intentions of participating in this discussion: American Engineering Co., Green Engineering Co., Combustion Engineering Co., James A. Brady Foundry Co., Underfeed Stoker Co. of America, Westinghouse Electric & Mfg. Co. and Sanford Riley Stoker Co.

New York

NEW YORK, Jan. 10.

Pig Iron.—Most of the purchasing done by the American Radiator Co. at Buffalo was for plants in that vicinity. It is understood that about 6000 tons was bought from one company. The purchases included 1000 tons of No. 2 plain and 500 tons of No. 3 for its Bayonne plant. The price is not announced, but it seems probable that it was under \$20, eastern Pennsylvania. Buffalo is reported selling at \$19 furnace for No. 2X. Some melters who did not buy at all last year are now buying moderate quantities. There is no disposition, however, to cover for requirements far into the future. Much interest is felt in the bidding on the segments for the vehicular tunnel between New York and New Jersey. As the delivery of the segments will cover about two years, it will be necessary to do some careful figuring and furnaces are cautious about committing themselves so far in advance.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	\$22.52 to \$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75..	23.02 to 23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.52 to 23.02
Buffalo, sil. 1.75 to 2.25.....	24.46 to 24.96
No. 2 Virginia, sil. 1.75 to 2.25.....	27.16 to 28.16

Ferroalloys.—Buying of ferromanganese is limited to carload and small lots for immediate needs of consumers and several sales of both British and American alloy are reported as made by the leading steel maker on a basis of \$60, Pittsburgh, and by British representatives at \$58.35, seaboard. While some consumers have been inquiring for 100 to 200 tons in several cases, these have not resulted in purchases of anything more than small lots. The spiegeleisen market is more active and sales are reported of at least 250 tons with the 20 per cent alloy going at \$26, furnace, and the lower grades at proportionately lower prices or around \$25, furnace. There is no demand for manganese ore and quotations continue nominal. The same conditions rule in the 50 per cent ferrosilicon market as in the ferromanganese market. Consumers buying only to fill their immediate needs. There have been sales of several carload and small lots on a basis of \$55 to \$57 per ton, delivered. Imports of ferromanganese in November were only 270 tons as contrasted with 7091 tons in November, 1920. The total to Dec. 1, 1921, was 8818 tons as contrasted with 53,830 tons to Dec. 1, 1920. Imports of manganese ore in November were 8620 tons as against 74,477 tons in November, 1920. The total for the 11 months of last year was 386,454 tons as against 542,189 tons to Dec. 1, 1920. Of the imports last November 8600 tons came from Brazil.

Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	\$60.00 to \$63.00
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegeleisen, 20 per cent, furnace, per ton..	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	\$55.00 to \$57.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrocromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered, 11c. to 14c.	
Ferrovandium, per lb. of contained vanadium	\$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates.....	\$2.00 up
Chromo ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.....	\$20.00 to \$25.00
Chromo ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.....	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	50c. to 60c.

Finished Iron and Steel.—Expected improvement in the demand for steel products has not yet materialized so far as this market is concerned. Inquiries and orders are few and for small tonnages, being a reflection largely of the business that has been done in the past two months. In structural steel, in which there has been the most activity locally, there are many prospects, but comparatively little business is being placed. February is expected to produce more orders as work under contemplation for spring will probably come into the market at that time. Jobs which have been awarded during the week include the following: One thousand

tons for bridges for the Baltimore & Ohio Railroad, to American Bridge Co.; pier at Forty-fourth Street, New York, 250 tons, to Blaw-Knox Co.; 500 tons for viaduct at Trenton, N. J., to McClintic-Marshall Co.; 1000 tons for a hotel at Frederick, Md., and 800 tons for an apartment house at Park Avenue and Eighty-eighth Street, New York, to Bethlehem Fabricators, Inc.; 300 tons for Fifth Street bridge, Philadelphia, to a Philadelphia fabricator; 400 tons for a factory at Providence, R. I., to Berlin Construction Co.; 300 tons for an apartment house on Fifty-first Street, New York, to Paterson Bridge Co.; 500 tons for a clothing factory at Rochester, N. Y., to Genesee Bridge Co. New projects up for bids include the following: Two hundred and fifty tons for a highway bridge in Monmouth County, New Jersey; 1000 tons for an apartment house on Grand Concourse, New York; 2000 tons of shapes, bars and plates for the New York-New Jersey vehicular tunnel, bids closing Feb. 10. The placing of orders for 4500 freight cars by the Union Pacific system is expected to be the forerunner of others by Western roads which have been pending for some time. The Union Pacific awarded 1000 box cars to the American Car & Foundry Co., 1000 box cars to the Mount Vernon Car Mfg. Co., 1000 automobile cars to the General American Car Co., 500 automobile cars to the Standard Steel Car Co. and 1000 all-steel automobile cars to the Pullman Co. About 3000 refrigerator cars are still to be bought by the Union Pacific. The Philadelphia & Reading is inquiring for 50 all-steel passenger cars; 50 of the suburban type were recently purchased. The Pennsylvania Railroad has asked prices on 20 all-steel dining cars. An inquiry for 1000 narrow gage box cars from the National Railways of Mexico is not being figured on by some of the car builders because of the three-year credit feature involved. The New York, Ontario & Western Railroad has ordered 30 steel passenger cars from the Standard Steel Car Co. Prices of steel products are nominally unchanged, though some weakness appears. On plates, for example, mills have shown a willingness to take car plates as low as 1.40c., Pittsburgh, though protection is not given at this price. Small lots command 1.50c., Pittsburgh. Shapes and bars are quoted at 1.50c., but many structural jobs are being figured at less than this price.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c.; plates, 1.83c. to 1.88c.; structural shapes, 1.88c.; bar iron, 1.88c. to 1.98c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The week has been extremely dull, devoid of interest, except for a general change in prices. In accordance with the prevailing mill quotations on bars, warehouses in this district, including the leading interest and the leading independent, have revised quotations by a reduction of about 15c. per 100-lb. Mild steel bars are now quoted at 2.53c. per lb., base, and structural material 2.63c. per lb., base. Plates, ¼-in. and heavier are 2.63c. per lb. and hoops 3.38c. per lb. and bands 3.13c. per lb. Tire and toe calk steel have been dropped to 2.50c. per lb. for the former and 3.20c. per lb. for the latter. Shafting and screw stock were reduced Jan. 9, to 3.45c. per lb. for rounds and 3.95c. per lb. for flats, squares and hexagons. While the prevailing price on galvanized sheets is 4.85c. per lb., base, sales have been made as low as 4.50c. per lb. and small lots of a few sheets will bring up to 5c. per lb. The brass and copper market is fairly active and prices firm. We quote prices on page 200.

High Speed Steel.—The market shows no change. Producers continue to quote 18 per cent tungsten high speed steel at 85c. to 95c. per lb. with special brands of some companies quoted as high as \$1.05 per lb.

Cast Iron Pipe.—The first part of the year witnesses a pleasing contrast to conditions a year ago. Then no plant was operating at more than 25 per cent capacity and was then making for stock; to-day the busiest plant is operating at 80 per cent capacity on actual orders. One pipe foundry a year ago had 600 tons of orders on books, whereas to-day orders total 10,000 tons. At present there is considerable private buying. We quote per net ton, f. o. b. New York, car-load lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Coke.—By-product coke has been reduced from \$8.97 to \$8.59 per ton, delivered to New Jersey points. Foundry coke remains from \$4 to \$4.50, Connellsville base.

Old Material.—The market tends toward strength rather than weakness, buying prices having been raised on clean cast borings, mixed borings and turnings and specification pipe. Borings are being shipped to Claymont, Del., and \$12, delivered Lebanon, has been paid for specification pipe. An eastern Pennsylvania mill is still very particular about the heavy melting steel being shipped to it and has been giving less than market price, claiming that the steel was below specifications. Some local dealers have received no more than \$6.50, New York, on some of this alleged inferior steel. A broker who has been warning his buyers that the "market shows further signs of weakness" and urging them to make contracts call for prompt shipment, has now omitted the "market weakness" warning and has extended orders for prompt shipment to "shipment in three weeks."

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$8.00 to	\$8.50
Steel rails, short lengths, or equivalent	8.50 to	9.00
Rerolling rails.....	9.50 to	10.00
Relaying rails, nominal.....	28.00 to	30.00
Steel car axles.....	10.00 to	10.50
Iron car axles.....	18.50 to	19.00
No. 1 railroad wrought.....	10.50 to	11.00
Wrought iron track.....	8.50 to	9.00
Forge fire.....	5.00 to	5.50
No. 1 yard wrought, long.....	9.00 to	9.50
Cast borings (clean).....	7.00 to	7.50
Machine-shop turnings.....	4.00 to	5.00
Mixed borings and turnings.....	4.50 to	5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	7.00 to	7.50
Stove plate.....	9.00 to	10.00
Locomotive grate bars.....	9.00 to	10.00
Malleable cast (railroad).....	8.00 to	8.50
Car wheels.....	10.50 to	11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$16.50 to	\$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	15.50 to	16.00
No. 1 heavy cast, not cupola size.....	14.00 to	14.50
No. 2 cast (radiators, cast boilers, etc.).....	10.00 to	10.50

Birmingham

BIRMINGHAM, ALA., Jan. 10.

Pig Iron.—A report of large tonnage having been booked could not be verified. It was probably due to agreements reached between a maker and consumer to take higher-priced and overdue iron mixed with some new iron at current prices. Business coming to the surface consisted of small lots for prompt delivery and the prevailing base was \$16.50. It is reported that Southern Pacific got 350 tons for San Francisco delivery at \$16 following strictly competitive bids. The 1300-ton movement to the Pacific Coast mentioned in some news comments last week was to Los Angeles via Mobile. The Pacific Coast base on foreign iron is now \$30 delivered, which, coupled with \$16.50 Birmingham base and freight rate via Mobile of \$14.13, comes very near establishing a Southern iron parity in that quarter. Increase in stocks on Alabama furnace yards Jan. 1 of 25,000 tons was expected following hold-up orders during the holidays. Stocks Dec. 1 and Jan. 1 were: Foundry, 51,000 and 74,000 tons; machine cast, 27,000 and 35,000; warrants, 5900 and 4800; basic, 43,000 and 37,000; totals, 127,000 and 152,000.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$16.50
Basic.....	15.50
Charcoal, warm blast.....	35.00

Finishing Mills.—The Tennessee company entered the second week of the year at 66 2/3 ingot capacity. The Ensley rail mill has 130,000 tons of rail orders, which stand for more than five months of steady operations at normal production capacity of 6000 tons a week. The Chickasaw Shipbuilding & Car Co. has booked the Seaboard Air Line order, which is 200 steel phosphate dump cars and 1000 ventilated box cars, besides repairs on 5000 bad order cars. This order and orders on hand means six months steady operations at the car plant. Hoop and band mills are idle. The

Gulf States Steel Co. is at 50 per cent of ingot capacity.

Cast Iron Pipe.—The pipe market has not developed much new business either in high pressure or sanitary. High pressure base is nominally \$33. Atlanta's water pipe specifications, expected soon, will approximate 8000 to 9000 tons. Nashville, Chattanooga and other cities are expected in the high pressure market this spring. The Stockham Pipe & Fittings Co., maker of pipe fittings, is on 50 per cent base.

Coal and Coke.—Coke base remains at \$5.50. Steam coal is selling at \$2 and under per ton f.o.b. mines. All coal is weak and listless.

Old Material.—Scrap dealers do not report any improvement in an extremely dull season. Yards have complete line of stocks, but very little is moving out except a few cast grades.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$11.00 to \$12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, Jan. 10.

Pig Iron.—The iron market showed a little more activity during the week, and while it still can be termed dull, the prospects are more encouraging. Inquiries, while mostly confined to carload lots, are more numerous, indicating in a great many cases shortage of iron on foundry yards. A Southern melter is understood to have made a firm offer for 2000 tons of Southern iron of \$15.50, Birmingham, but so far the offer has not been accepted. The Southern market can still be quoted at \$16.50, but a round tonnage could probably be negotiated at \$16. In the North, \$19 to \$19.50 represents the market, although reports are current that \$19 is being shaded on round tonnages, there were a few sales of a hundred tons each reported. A southern Ohio stove maker took 200 tons of iron on a \$20 furnace basis, and a Springfield manufacturer 150 tons at \$19.50. Two sales of 100 tons each were made to Indiana melters on the basis of \$19, Chicago. Inquiries include 250 tons from the Louisville & Nashville Railroad, 300 tons for a central Ohio melter and 500 tons for a Southern melter. There are also several carload inquiries for ferroalloys before the trade.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$21.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	21.50
Ohio silvery, 8 per cent sil.	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	\$22.02 to 22.52
Rustic, Northern	22.02
Malleable	22.52

Finished Material.—During the week the finished material market was rather dull, although a number of small orders for various products were placed. One of the largest orders for sheets placed for some time was booked by a southern Ohio mill, the tonnage involved being 300. This was taken at the base price of 4c. for galvanized. On bars, shapes and plates there was very little activity, orders being confined mostly to carload lots. The Big Four Railroad opened bids on its first quarter requirement for bars, shapes, plates, forging billets and tires. The low bid on the bars, shapes and plates was 1.50c. Pittsburgh, made by practically all companies. On forging billets, \$34 a ton was quoted by a Valley mill and on tires, 5.25c. for rough and 6c. for finished bored were the low bids. Some business developed in wire products, mostly for nails, at the \$2.50 base. In the structural field, a number of new projects came up. Included in these was the Wilde Bank Building, Indianapolis, 700 tons being involved. Bids are now being taken on this job. Plans will be sent out on Jan. 16 for the new building of the Indianapolis Athletic Club for which 800 tons of structural steel will be fabricated. Bids will close on Jan. 26 for the Jewish Hospital at Memphis, taking 300 tons of bars. There were few lettings of importance. The

general contract for the Capital Hotel at Frankfort, Ky., was let to Parks & Co. of Chattanooga. Bids were opened on Jan. 8 for an auditorium and market building at Memphis, Tenn., taking 3500 tons; all bids were rejected and new ones will be called for. Extension of time till Jan. 30 has been made for taking bids on the Belknap Warehouse at Louisville, Ky.; bids are being taken on both the concrete and steel structures. Pending projects include a \$3,000,000 hotel building planned for Columbus, Ohio. The hotel will be 16 stories and will contain 600 rooms. It will be operated by the Deshler Hotel interests. Frank L. Packard, Columbus, Ohio, has been retained as the architect. The Tri-State Hotel, Memphis, a 14-story building, will be up shortly, plans having been completed.

Warehouse Business.—Local jobbers report business as fair in wire products, but in steel conditions are about the same as last reported, there being little activity. Wire jobbers have reduced the price of nails to \$3 per keg, base, and No. 9 annealed wire to \$2.85 per 100 lb. Corresponding reductions were also made in other wire products following the reductions recently made by the mills. No price changes have been made on iron and steel products other than wire, but it is expected that reductions will be made within the next week or ten days.

Iron and steel bars, 2.90c. base, hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Coke.—There is only fair activity in the coke market, with orders confined mostly to single carloads. There is very little contract coke being sold, buyers apparently having decided to depend on the spot market for supplies. Prices are not notably changed.

Old Material.—There is very little demand for scrap in the local market, although dealers report some activity from other districts. Carload orders predominate. Prices rule about the same as have been quoted for some weeks.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	\$3.50 to \$4.00
Iron rails	12.00 to 12.50
Relaying rails, 56 lb. and up	25.00 to 26.00
Re-rolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Foundry scrap	7.50 to 8.00
Iron axes	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Cleveland

CLEVELAND, Jan. 10.

Iron Ore.—Owing to the policy of many consumers to ship, before the restoration of the higher freight rates, all the ore on docks that they would need for some time, shipments from Lake Erie docks held up well during December, amounting to 597,398 gross tons. Dock shipments in December, 1920, were 1,251,315 tons. The dock balance on Jan. 1 was 8,434,324 tons as compared with 9,927,317 tons on the same date a year ago. Total shipments from Lake Erie docks for the season were 12,793,077 tons as compared with 33,267,969 tons during the previous year.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—The demand for foundry iron has improved somewhat since the first of the year, but the buying is mostly in small lots. Some of the orders were for the first quarter or 60 days delivery, but in the majority of cases, for prompt shipment. The American Radiator Co. again came into the market, placing 2000 tons of iron for its Detroit plant, 1500 tons of which went to a Detroit furnace, and 5000 tons for Buffalo, the latter being placed at a reported price of

\$19.50. One lake furnace during the week sold 4000 tons, mostly in small lots of foundry iron and including 500 tons placed by a Michigan automobile foundry. Prices show no change, with lake furnace quotations ranging from \$19 to \$20 on No. 2 foundry iron. A sale of 250 tons was made by a western Pennsylvania furnace on a \$19.50 Valley basis and other sales are reported at \$20 Valley. For Cleveland delivery, local furnaces appear to be no longer trying to get over \$20 for foundry iron. A sale of 200 tons of No. 1 was made to a local consumer at \$21 furnace. The Trumbull Steel Co., Warren, Ohio, has definitely decided to blow in its new furnace Jan. 16.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	\$20.21 to \$20.71
Northern No. 2 fdy., sil. 1.75 to 2.25	19.00 to 20.00
Southern fdy., sil. 2.25 to 2.75	24.17
Ohio silvery, sil. 8 per cent.	32.86
Standard low phos., Valley furnace..	33.00

Finished Iron and Steel.—The new year has not as yet brought out an increased demand for finished iron and steel. Orders placed during the week were in miscellaneous lots in about the same volume as during December, and there is nothing to indicate a material increase in business during the next few weeks, although a somewhat better volume of orders is expected with the completion of inventories. Consumers are buying only for their immediate requirements. The automobile industry generally has gotten under way with good production after the holiday shutdown. The Ford Motor Co., which resumed operations Monday, has a January production schedule of 50,000 cars, or about half its maximum for a full month. Some new inquiry has come from the railroads. The Ralston Steel Car Co. is inquiring for 4000 tons of steel for cars and for axles and wheels and the Louisville & Nashville Railroad has an inquiry out for 3500 tons of splice bars. The New York, Ontario & Western Railroad is inquiring for six mountain type locomotives. The dock cranes for New York taken by the Wellman-Seaver-Morgan Co. will require 900 tons of steel bars, plates and structural shapes. The price situation shows little change. On steel bars, 1.50c. is the generally recognized price even for a small lot. While large mills are quoting plates at 1.50c., small lot sales are being made at 1.60c. and 1.65c., which are the minimum prices quoted by local mills. Hard steel reinforcing bars are dull and weak, with one sale made at 1.45c. Quotations of 1.75c. are still reported on bands in strip mill sizes. With little working prospect, the outlook for an early resumption of demand for structural material in the building field is not bright. No lettings are reported and the only new inquiry is for 400 tons for a sewage disposal plant in Milwaukee.

Jobbers quote steel bars, 2.36c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3.25c.; No. 9 annealed wire, 2.75c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—The demand for sheets has improved somewhat since the first of the year, but buying is almost wholly in small lots. The Ford Motor Co. has an inquiry out for an unspecified tonnage for frame stock. Regular mill prices are being maintained.

Warehouse Business.—Cleveland warehouses have reduced prices \$3.60 a ton on steel bars, plates, shapes and hoops and bands. The new prices recognize a reduction of \$3 a ton in mill prices, being based on 1.50c. for steel bars and 1.60c. for plates and structural material, and buyers are given the advantage of 60c. a ton because of the freight differential of 3c. per 100 lb. allowed in the short haul rates as compared with the through Pittsburgh Cleveland rate. Warehouse prices on cold-rolled steel have been reduced \$5 a ton. Warehouse business is light.

Bolts, Nuts and Rivets.—Bids will be taken Feb. 7 for 5000 to 10,000 tons of 1½-in., 8-in. long, alloy steel bolts for the vehicular tunnel, New York. Preliminary estimates were asked for these bolts several weeks ago, but the inquiry has just come out in definite form. There was little activity in the past week, but with the

inventories over, makers expect that the present week will indicate how much of a buying movement there will be. Consumers have been withholding purchases until the first of the year and stocks generally are low. The demand for rivets shows some improvement. A local maker has taken 350 tons from a Chicago car builder and two other orders aggregating 155 tons from boiler and bridge shops. These orders were placed at 2.25c. for structural rivets and 2.85c. for boiler rivets. A number of first quarter contracts have been taken at these prices.

Coke.—The demand for foundry coke became rather lively during the week, many foundries placing orders for from one to four carloads for prompt shipment. No contract business is being placed. Prices range from \$4 to \$4.25 for standard Connellsville makes.

Old Material.—The market has a better tone owing largely to the fact that Valley mills that had held up shipments before the holidays are again taking scrap and this has resulted in some activity between dealers. A local mill is in the market for heavy melting steel scrap at \$13 delivered and is reported to have purchased a small tonnage at that price. This local demand has resulted in an advance of about 50c. a ton on this grade. There is also some local demand for machine shop turnings for which \$8.75 delivered is being offered. Valley district mills have not come into the market for scrap since the first of the year, but one Youngstown consumer has advised the trade that it will buy scrap about Feb. 1. Mixed borings and turnings are rather weak owing to the absence at present of local demand. Sales of compressed steel scrap are reported at \$9 to \$9.50, Cleveland, for Youngstown delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$12.00 to \$12.50
Steel rails, under 3 ft.....	12.50 to 13.00
Steel rails, rerolling.....	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	13.00 to 13.50
Cast borings	8.60 to 9.00
Machine shop turnings.....	8.00 to 8.25
Mixed borings and short turnings...	8.60 to 9.00
Compressed steel	9.00 to 9.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings.....	6.00 to 7.00
Steel axle turnings.....	9.00 to 10.00
No. 1 cast.....	15.00 to 16.00
No. 1 busheling.....	8.25 to 8.75
Drop forge flashings, over 10 in.....	7.50 to 8.00
Drop forge flashings, under 10 in....	7.50 to 8.00
Railroad grate bars.....	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues.....	8.50 to 9.00

Philadelphia

PHILADELPHIA, Jan. 10.

New year developments in the local iron and steel trade have been so few and so unimportant that no definite trend is indicated. The attitude of sellers is still one of expectation, with no groundwork on which to base predictions as to when trade recovery is likely to set in. Many manufacturing consumers are still engrossed in details of annual inventory and are not in a buying mood. Neither inquiries nor orders have shown any increase within the past week; in fact, some steel companies report the market the duller in many weeks, and the same holds true to a large extent of pig iron, ferroalloys and scrap.

Pig Iron.—Though the local pig iron market was extremely dull during the past week, a better inquiry is expected soon, as many foundry iron users have not covered for their first quarter requirements. Little iron has been sold since the first of the year. We note one sale of 800 tons of foundry grade last week, but most of the sales have been small lots. Eastern Pennsylvania furnaces are firm in quotations of \$20, furnace, on No. 2 plain, \$20.50 on No. 2X and \$21 on No. 1X. There have been no sales of basic, but a Delaware steel maker is considering the purchase of 1000 tons. Gray forge, in small lots, has sold at \$19.50 to \$20.50, furnace. A railroad equipment company is inquiring for 1000 to 3000 tons of copper-bearing low

phosphorus iron. A sale of 100 tons of copper free low phosphorus iron has been made at \$30, furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.84 to \$21.86
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.24 to 27.74
Virginia No. 2X, 2.25 to 2.75 sil.	27.74 to 28.24
Basic delivery eastern Pa.	20.25
Gray forge	20.50 to 21.50
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Ferromanganese is offered at \$58.35, seaboard, and spiegeleisen at \$25, furnace, but there is very little business.

Billets.—Open-hearth rerolling billets are offered at \$28 and forging billets at \$32, Pittsburgh, some makers asking \$1 higher.

Rails.—The Pennsylvania Railroad has distributed orders for 80,000 tons of 130-lb. rails for 1922 delivery as follows: Carnegie Steel Co., 40,000 tons; Bethlehem Steel Co., 18,000 tons; Cambria Steel Co., 18,000 tons; Lackawanna Steel Co., 4,000 tons. The road has 25,000 tons of rails on hand but not laid, and 48,000 tons on order from its 1921 contracts which has not been rolled.

Finished Steel.—There is a dearth of orders and inquiries for plates, shapes, bars, sheets and other forms of rolled steel. It is probably yet too early in the new year to expect any marked change for the better. Many manufacturing consumers are still deeply engrossed in problems of inventory and settling up last year's affairs and are giving little or no thought to purchases. Steel company salesmen, in making their rounds, find many plants closed down, or virtually so, with no plans for early resumption of activities. Prices of plates, shapes and bars are nominally 1.50c., Pittsburgh. One leading Eastern independent is holding rigidly to this schedule and some others have a fairly steadfast price policy. Buyers continue to tell steel sales departments that 1.50c. can be shaded, but definite transactions at lower prices have not recently been reported in such a way as to be readily substantiated. It is admitted by some sellers that concessions might be offered on very attractive tonnages, but there has been little or no attractive business in the past two weeks. Sheets are holding firmly at 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, base, Pittsburgh.

Bar Iron.—There is little demand for bar iron, which is still quoted by Eastern mills at 1.50c., Pittsburgh.

Warehouse Business.—Local warehouses have reduced prices 15c. per 100 lb. on soft steel bars and small shapes, iron bars, except bands and steel bands. No. 12 gage to 3/16-in. inclusive, and 25c. per 100 lb. on steel hoops, No. 13 gage and lighter.

Old Material.—With the exception of a slight advance in cast iron borings, which are in demand and none too plentiful, the scrap market is dull and prices are unchanged. We quote for delivery at consumers' works in this district as follows:

No. 1 heavy melting steel	\$11.50 to \$12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	16.25 to 16.75
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 bushing	12.00 to 13.00
No. 2 bushing	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	17.00 to 18.00

IRON ORE PRODUCTION OF 1921

Lowest Output Since 1904—Shipments Below Production—Stocks Increased

Figures of the United States Geological Survey show that the iron ore mined in 1921 amounted to 29,547,000 gross tons, compared with 67,604,465 tons in 1920, a reduction of 53.6 per cent. These figures are exclusive of ore containing more than 5½ per cent of manganese. Minnesota furnished 61.2 per cent of the ore mined, compared with 58.4 per cent in 1920. The Lake Superior region furnished 85.9 per cent, compared with 85.7 per cent. Alabama furnished 9.9 per cent, compared with 8.7 per cent in 1920. The output of 1921 was the lowest since 1904, when 27,644,330 tons was mined.

Shipments of ore from the mines are estimated for 1921 at 27,009,000 gross tons, compared with 69,281,341 tons in 1920, a decrease of 61 per cent. The value of ore shipped was given as \$89,688,000 compared with \$285,006,327 in 1920, a decrease of 68.9 per cent. The average price per ton was estimated at \$3.32 in 1921 and \$4.11 in 1920. Stocks of ore held at the mines, mainly in Michigan and Minnesota, increased from 11,379,000 gross tons in 1920 to 13,872,000 tons in 1921, a gain of 22 per cent. More than 2,070,000 tons of this increase was in Michigan, and about 325,000 tons in New York.

Of the tonnage shipped from the mines in the Lake Superior district, amounting, according to the estimate, to 23,155,000 tons, the great bulk as usual went by water. Figures of the Lake Superior Iron Ore Association show water shipments at 22,300,726 tons, a decrease of 62 per cent compared with 1920.

Imports of iron ore for the first eleven months of the calendar year amounted to 313,613 gross tons, valued at \$1,065,033 or \$3.40 per ton. Imports for the entire year 1920 were 1,273,456 tons, valued at \$4,963,654 or \$3.90 per ton. Exports of iron ore for the eleven months were 438,126 tons, valued at \$2,069,897 or \$4.72 per ton, compared with exports for all of 1920 amounting to 1,145,037 tons, valued at \$6,198,927, or \$5.41 per ton.

In the appended table will be found the principal particulars relating to the ore mined and shipped in the United States in the two years, figures for principal producing states being given separately.

State or District	Ore Mined, Gross Tons			Decrease, Per Cent	Ore Shipped, Gross Tons			Decrease, Per Cent
	1920	1921			1920	1921		
Minn.	39,453,173	18,093,000	54.1		39,747,594	18,056,000	54.6	
Mich.	17,510,742	7,054,000	59.7		18,862,578	4,981,000	73.6	
Wis.	921,134	247,000	74.8		1,067,159	118,000	88.9	
Lake Superior	57,945,049	25,394,000	56.2		59,677,331	23,155,000	61.2	
Ala.	5,894,011	2,927,000	50.3		5,833,317	2,876,000	50.7	
Other South eastern*	872,753	95,000	89.1		869,413	71,000	91.8	
N. Y.	920,009	470,000	48.9		959,408	154,000	83.9	
N. J.	431,667	58,000	86.6		417,100	108,000	74.1	
Pa.	734,383	140,000	80.9		719,813	182,000	74.7	
Western States†	740,226	429,000	42.0		740,537	429,000	42.1	
Other States‡	66,437	34,000	48.8		64,422	35,000	45.7	
Total	67,604,465	29,547,000	56.3		69,281,341	27,009,000	61.0	

*Georgia, North Carolina, Tennessee and Virginia.

†Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Washington and Wyoming.

‡Connecticut, Maryland, Massachusetts and Missouri.

Dwight P. Robinson & Co., engineers and constructors, New York and Chicago, have secured important contracts from the Duquesne Light Co., Pittsburgh, and the New Orleans Railway & Light Co. The work for the Duquesne Light Co., of which A. W. Thompson is president and C. S. Cook general manager, includes the installation of the second unit of 60,000 kw. at the Colfax power station, together with three additional substations along the company's lines in the Pittsburgh district. The Colfax station is designed ultimately to be one of the largest steam stations in the country, containing six 60,000 kw. units.

British Iron and Steel Market

General Improvement in Both Iron and Steel— Continental Competition Less Felt—Freight Rate Reduction Demanded

(By Cable)

LONDON, ENGLAND, Jan. 10.

Expansion of pig iron business is confidently anticipated if prices are further reduced. Makers are anxious to restart more furnaces. Hematite demand has improved, stocks are diminishing and additional furnaces are expected to start. Prices are easier.

Welsh works are buying low-grade Spanish ores. Other consumers are purchasing North African ore at 22½s. (\$4.75) c.i.f. Bilbao Rubio is nominally 26½s. (\$5.59) c.i.f.

Steel position is improving, as English makers are now less ready to accept low figures for export. Scotch works are reducing prices; quarter-inch ship plates are now £9 15s. (1.84c. per lb.) delivered. Scottish trade is pressing for a reduction in railroad rates.

Few sellers of Belgian merchant bars are quoting below £8 (1.51c. per lb.) f.o.b. German merchant bars are held at £7 15s. (1.46c. per lb.) f.o.b. Belgian beams are now offered at £9 7½s. (1.77c. per lb.) delivered Midlands. Merchants are quoting Belgian beams at £8 7½s. (1.58c. per lb.) c.i.f. India.

German wire nails to Japanese assortments are offered at 25s. (\$5.27) c.i.f., with shipments in from six to eight weeks. American makers are quoting wire nails at 24s. (\$5.06) c.i.f. Japan.

Tin plates are steadier on bear covering of contracts, and there is less pressure to realize on stocks, by certain works. Export demand is improving; Canada has been inquiring.

Galvanized sheet demand is slow. Black sheets, to Japanese specifications, are being sold at £19 5s. (3.63c. per lb.) c.i.f. Scotch works are taking orders on thick sheets at low prices.

We quote gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.22 per £1 as follows:

Durham coke, delivered...	£1 8			\$5.91
Cleveland No. 1 foundry	5 5	& 5 10*		23.11 & 23.21*
Cleveland No. 3 foundry	5 0	& 5 5*		21.10 & 22.11*
Cleveland No. 4 foundry	4 15			20.05
Cleveland No. 4 foundry	4 10			18.99
Hematite	7 0*			29.54*
East Coast mixed	4 16½	& 5 0*		20.36 & 21.10*
Ferromanganese	15 0	& 14 10*		63.30 & 61.19*
Rolls, 60 lb. and up	8 0	to 9 10		33.76 to 40.09
Billets	7 15	to 8 0		32.71 to 33.76
Sheet and tin plate bars,				
Welsh	7 5	to 7 15		30.60
Tin plate, base box	0 19½	to 1 0½		4.06 to 4.27
				C. per lb.
Ship plates	9 10	to 10 10		1.79 to 1.98
Boiler plates	14 0	to 14 10		2.64 to 2.73
Tees	10 0	to 11 0		1.88 to 2.07
Channels	9 5	to 10 15		1.74 to 2.03
Beams	8 0	to 10 0		1.51 to 1.88
Round bars, ¾ to 3 in.	10 10			1.98
Galvanized sheets, 24 g.	16 10			3.11
Black sheets	13 10			2.54
Steel hoops	12 0	& 12 5*		2.26 & 2.31*
Cold rolled steel strip, 20 g.	24 10			4.62

*Export price.

Cleveland Blastfurnacemen Take Reduction in Wages—Price Cut by Scottish Producers —Shipbuilding in 1921

LONDON, ENGLAND, Dec. 28.—Practically all works closed down at the end of last week for the holidays, and will not resume until after the new year. A point of interest, however, is that Cleveland blast furnacemen have agreed to a reduction in wages, or rather to a temporary suspension of the sliding scale, and from Jan. 1 the district percentage payable on base rates will be reduced from 77¼ to 36 per cent. It will thus be seen that workers are at last beginning to realize that their future prosperity is dependent upon their agreeing to take less money, as it is only by this means that selling prices can come down to levels at which buyers will show an inclination to purchase.

The *Labor Gazette* states that the cost of living index figure is down to 99 per cent above that of July,

1914, and is now at the lowest recorded since May, three years ago.

Cleveland pig iron is still held for £5, but there is talk that the new year will see a further reduction. Whether this will be so or not remains to be seen, but the recent concessions by the railroads have not been met with open arms, as traders were hoping that the cut would amount to at least 50 per cent, and are now asking when there will be a concession on rates for finished steel which furnish quite a considerable portion of the transport revenue of the roads. Railroad companies in Scotland have not yet reduced rates at all in spite of urgent representations made by the Scottish iron and steel trades. They have, however, offered certain small concessions in demurrage charges and an extension of the free time allowed for loading and unloading wagons.

Scottish steel makers have further been cutting prices and quote £9 10s., delivered, for ship plates to home consumers and £9 2s. 6d. f.o.b. for export, while for angles for export they quote £9 7s. 6d. f.o.b., these prices all being generally lower than English makers will take. Business is naturally quiet this time of the year, especially as the works in general will not resume until next week.

The Clyde shipbuilding output for the year is returned as 314 vessels of a total of 514,549 tons against 569,960 tons in 1920. There were no large liners but many vessels for mail and passengers were completed, the largest one being "Windsor Castle" of 19,000 tons built by John Brown & Co.

The Firth of Forth shipbuilding output for the year totaled 15 vessels of an aggregate tonnage of 37,203 against 28 vessels of total tonnage 64,399 in 1920. One prominent builder is reported to have said that he does not think the trade depression will last many months, though the immediate outlook is not promising.

Corporation's Unfilled Orders Increased in December

Unfilled orders on the books of the United States Steel Corporation, Dec. 31, were 4,268,414 tons compared with 4,250,542 tons on Nov. 30, an increase of 17,872 tons. This compares with a decrease of 36,287 tons in November and an increase of 28,744 tons in September, the rest of the months of the year showing decreases, the largest having been in March at 649,102 tons. The unfilled tonnage a year ago was 8,148,122 tons, or 3,879,708 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,792,081	6,010,787	9,288,448
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,928	10,805,038	6,109,103	8,759,042
Sept. 30	4,560,670	10,374,804	6,234,638	8,297,905
Oct. 31	4,286,829	9,836,852	6,472,668	8,353,293
Nov. 30	4,250,542	9,021,481	7,128,330	8,124,663
Dec. 31	4,268,414	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Eastern Bar Iron Institute Dissolves

The Eastern Bar Iron Institute, which was established under the Eddy system of open price competition, with offices at 103 Park Avenue, New York, passed a resolution at a special meeting in Philadelphia late in December to dissolve on Dec. 31. The decision appears not to represent any concern that the association operated under any of the conditions which obtained in the so-called hardwood lumber case, but rather that it is a result of chaotic trade association and business conditions which prevailed before the announcement of the decision and which have seemingly multiplied since that time. Albert C. Taylor, secretary of the association, is at present engaged in closing out the affairs of the organization.

OPEN PRICE POLICY *

Government Will Not Announce Policy as to Supreme Court Decision

WASHINGTON, Jan. 10.—The Department of Justice will not announce in any form a Government policy relating to open price associations. This statement was made this afternoon by Attorney General Daugherty, and came as a complete surprise. Previous statements from other Government sources had led to the well-defined belief that the Government would outline and make public such a policy based on the decision of the Supreme Court in the Hardwood Lumber case. Plainly, the Department of Justice position conflicts with that of the Department of Commerce, which had been seeking to have a Government policy fixed and announced and the statement was made only this week that conferences to this end were under way. It is now a question as to what the effect may be with regard to further co-operation between the Department of Commerce and trade associations which have been supplying it with information. Already this co-operation has been lessened somewhat in consequence of the Hardwood decision.

The Attorney General, however, said that the Hardwood decision is the most far-reaching and helpful on the subject involved that ever had been handed down

by the Supreme Court. While the Government desires to be accommodating to business, it was stated it will not go to the point of defeating the purposes laid down by the decision. It was pointed out that there are a large number of civil cases pending in the courts and that any "concessions" the Government made in attempting to interpret the decision, said to be so clear it cannot be misunderstood, might prejudice many of the cases now under judicial review.

When asked if the plans of Secretary Hoover to co-operate with trade associations will be modified, the Attorney General said that if he discussed this matter it would be with Mr. Hoover only. He said he was sure, however, that Secretary Hoover would pursue nothing but a legitimate policy.

Referring to what he termed the clearness of the Supreme Court decision in the Hardwood case, Mr. Daugherty said: "We are compelled to maintain a position which is so fully justified by the decision of the Supreme Court."

The Attorney General said that the Department of Justice would not ordinarily interfere with the proposal of Secretary Hoover regarding the announcement of a policy, but that he would not state such a policy as coming from the Department of Justice, and it was suggested that any statement coming from any other department might weaken the position of the Government.

Hearings on Pittsburgh Basing Case at Milwaukee

WASHINGTON, Jan. 10.—Announcement was made to-day by the Federal Trade Commission that the date for hearings in the Pittsburgh base case to begin at Milwaukee had been set tentatively on Jan. 30. The examination of witnesses on behalf of the commission will be in charge of Attorney-Examiner K. E. Steinhauer, who will be assisted by Attorney-Examiner E. W. Burr. The procedure outlined calls for the presentation of the commission's side of the case through the examination of its witnesses, to consist of, among others, members of the Western Association of Rolled Steel Consumers, and additional users of steel products, upon whose application the commission issued the complaint in the case against the United States Steel Corporation and 11 subsidiary companies. After the commission completes examination of its witnesses, the Steel Corporation then will take up its side of the case, calling an examination of its witnesses. This will be followed by any rebuttal evidence desired by the commission.

The plan is that the commission shall complete its examination of witnesses at each point before Steel Corporation witnesses are called, so that this will probably make it necessary to return to different points where hearings are held, in order that Steel Corporation witnesses may be heard. The itinerary to be covered during the hearings will embrace widely scattered consuming points as well as steel centers.

Warren Plants Merged

The Warren Tool & Forge Co., Warren, Ohio, has purchased the plants of the General Malleable Co. and the American Block & Mfg. Co., both located in Warren, and the three plants will be operated under the name of the purchasing company. The capital stock of the merged company is \$1,800,000. The Warren Tool & Forge Co. is a large manufacturer of contractors' and track tools. The malleable iron foundry of the General Malleable Co. has a capacity of approximately 600 tons of castings per month, a large proportion of which goes to the railroads. The American Block & Mfg. Co.'s plant was built for the manufacture of malleable unions with bronze inserted seats. The Warren Tool & Forge Co. will continue to operate under its old man-

agement. James D. Robertson, Pittsburgh, is president; N. J. Konold, vice-president; George Konold, treasurer and general manager, and George F. Konold, Jr., secretary.

Approves Bond Issue to Purchase Haskell & Barker Car Co.

WASHINGTON, Jan. 10.—The Interstate Commerce Commission to-day granted the application of the Pullman Co. for the issuance of 165,000 shares of capital stock for the purpose of acquiring all of the assets of the Haskell & Barker Car Co., organized under the laws of New York, but having its plant at Michigan City, Ind. The Pullman Co., in its petition, says the net book value of the car manufacturing company is \$16,900,000. The physical value of plant and property, less depreciation up to Jan. 31 next, is listed at \$6,095,000. The total current assets, including securities, cash, and bills receivable, amount to \$12,520,000. Car trust contracts amount to \$1,606,000, and car repair accounts amount to \$1,247,000. Among other receivable items listed is \$4,000,000 in notes, which have since been paid, and the amount reinvested in United States Liberty bonds. There also was listed among the assets miscellaneous accounts, amounting to \$441,000. The car manufacturing company's stock quoted recently on New York Stock Exchange ranged in value from 50½ to 82, while the total outstanding shares of the car manufacturing company's stock on the basis of these quotations ranged in value from \$11,110,000 to \$18,000,000. In the Pullman Co.'s total assets amounting to \$163,000,000 is included \$148,000,000, representing the value of 7,750 cars and equipment.

Federal Policy as to Trade Associations

WASHINGTON, Jan. 10.—Conferences between Attorney General Daugherty, Secretary of Commerce Hoover, and other officials of the Government, regarding a Federal policy as to trade associations, are to be resumed within a few days. At a conference last week, during which the proposed policy was discussed, in the light of the interpretation of the Sherman anti-trust act by the Supreme Court in the decision relating to the Hardwood Lumber Association, the Government officials were unable to reach an agreement.

NON-FERROUS METALS

The Week's Prices

Jan.	Cents Per Pound for Early Delivery							
	Copper, New York		Straits		Lead		Zinc	
	Lake	Electro-lytic*	Tin New York	New York	St. Louis	New York	St. Louis	
4.....	13.87½	13.62½	32.25	4.70	4.40	5.17½	4.82½	
5.....	13.87½	13.62½	32.25	4.70	4.40	5.17½	4.82½	
6.....	13.87½	13.62½	32.50	4.70	4.40	5.15	4.80	
7.....	13.87½	13.62½	...	4.70	4.40	5.15	4.80	
9.....	13.87½	13.62½	32.12½	4.70	4.40	5.12½	4.77½	
10.....	13.87½	13.62½	32.12½	4.70	4.40	5.12½	4.77½	

*Refinery quotation.

New York

NEW YORK, Jan. 10.

The markets are all only moderately active with the price tendency firm in some and easy in others. Buying of copper is light and prices are steady. Only a moderate business has been done in tin at slightly lower levels. Demand for lead is better than for most of the metals and the price tendency is strong. Zinc is the weakest of the four major markets and prices are lower.

Copper.—The first week of the new year has witnessed sales of moderate amounts of electrolytic copper and inquiry for the first quarter continues to indicate a good business in the future. Rumors persist that sales of at least moderate amounts can be negotiated at 13.75c., delivered, or 13.50c., refinery, but efforts to locate actual sales by producers or dealers willing to sell at this price have been without result. It is intimated that such quotations have been made as a basis for the purchase of ores and that no actual sales have resulted. In any event, the amount obtainable at this low level is regarded as extremely limited. While some large producers either refuse to quote at all or are willing to quote a minimum of 14c., delivered, most of the remaining sellers will sell at nothing less than 13.87½c., delivered, or 13.62½c., refinery, which we quote as the market, these levels applying to January and first quarter metal. While there has been some inquiry for second quarter there is no inclination to make sales for this position.

Tin.—The principal topic of conversation has been the annual statistics which have shown the largest visible supply of tin in several years. On Dec. 31 this was reported to have been 25,220 tons, as against 19,410 tons on Dec. 31, 1920. This includes principally Straits and some Banca and some Billiton and does not include holdings in the hands of the governments at Singapore nor of the Dutch. Despite this apparently unfavorable report it was not regarded as a reason for any pessimism nor was there any break in the London market on the announcement of the publication of these statistics. The market has been quiet and dull with prices slightly lower than those a week ago. Spot Straits tin was quoted today at 32.12½c., New York, and the London market quotations were £165 5s. for spot standard, £167 for future standard and £166 10s. for spot Straits, or from £3 to £4 per ton less than a week ago. On the New York Metal Exchange on Thursday 25 tons of January-February shipment from the East was sold at 32c., with sales later in the day at 32.50c. by importers, and on Friday on the exchange 50 tons of January shipment was sold at 32.25c. and 25 tons of April shipment at 32.50c., both below the cost of import. Arrivals thus far this month have been 1580 tons with 6200 tons reported afloat.

Lead.—Demand for lead continues very good at prevailing prices, business being divided between the leading interest and independents, at 4.70c., both New York and St. Louis for the former and at 4.40c., St. Louis and 4.75c., Eastern points for the independents. It is understood that one independent producer has sold its entire January output and light sales have been made in one or two cases at 4.75c., delivered, Eastern points.

Zinc.—This market is largely a waiting one, depending upon the developments in the steel market and the demand for galvanized sheets. Thus far actual sales are limited to carload and small lots for immediate needs and, in the absence of any large demand, prices have eased until prime Western for early delivery is quoted at 4.75c. to 4.80c., St. Louis, or 5.10c. to 5.15c., New York, with some business done at 4.77½c., St. Louis, or 5.12½c., New York. It is stated that there are still some prospects for export business in the coming months.

Antimony.—The market is quiet and prices are nominal at 4.50c., New York, duty paid, for wholesale lots for early delivery, and it is admitted that this might be shaded.

Aluminum.—Virgin metal in wholesale lots, 98 to 99 per cent pure, for early delivery, is quoted at 19.10c. f. o. b. plant for 15-ton lots, but the same metal by importers is quoted at 17c to 18c., New York, duty paid.

Old Metals.—Business has been very quiet, but values remain firm, holders being unwilling to accept lower prices than those prevailing during the high mark in December. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.25
Copper, heavy and wire.....	12.50
Copper, light and bottoms.....	10.00
Heavy machine composition.....	10.25
Brass, heavy.....	8.00
Brass, light.....	6.00
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy.....	4.25
Lead, tea.....	3.25
Zinc.....	3.00

Chicago

JAN. 10.—Buying has diminished to the irreducible minimum and prices are slightly weaker, tin and spelter having declined. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 14c.; tin, 33.50c.; lead, 4.50c.; spelter, 4.85c. to 4.90c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 8c.; red brass, 8.25c.; yellow brass, 5.75c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

JAN. 10.—Lead held steady at the 4.40c. level throughout the week, while slab zinc was dull at 4.80c., carlots. On old metals we quote: light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Will Pass Soldiers' Compensation Act

WASHINGTON, Jan. 10.—It was stated with emphasis at the White House this afternoon that undoubtedly Congress will soon pass some sort of a soldiers' compensation act. The Administration made it known that it is in favor of some measure more or less like the Fordney bill, which provides for raising of the necessary money through a sales tax. The Administration is not in favor of any measure unless it specifically carries a provision for the necessary payment. It therefore is opposed to the suggestion that the Government rely on interest from allied debts owing the United States, because, while it was stated it is not doubted that the debts and interest will be paid, it is not possible to say how long it will be necessary for the soldiers to wait for their money if it must come from interest on the debts.

No. 4 furnace at the New Castle, Pa., works of the Carnegie Steel Co. will be blown in Jan. 16. The other three stacks of this group already are in blast.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	\$0.265	Kansas City	\$0.815
Philadelphia, export.	0.265	Kansas City (pipe)	0.77
Baltimore, domestic.	0.335	St. Paul	0.665
Baltimore, export.	0.255	Omaha	0.815
New York, domestic.	0.38	Omaha (pipe)	0.77
New York, export.	0.285	Denver	1.35
Boston, domestic.	0.415	Denver (wire products)	1.415
Boston, export.	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail.	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c.
Sheared plates, ¼ in. and heavier, tank quality, 1.50c.

Wire Products

Wire nails, \$2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.15; galvanized fence staples, \$3.15; painted barbed wire, \$2.65; polished fence staples, \$2.65; cement-coated nails, per count keg, \$2.00; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1,000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ½ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads, 65 and 10 to 70 per cent off list
Longer and larger sizes, 65 and 10 to 70 per cent off list
Lag bolts, 70 and 10 to 70, 10 and 5 per cent off list
Flow bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list
Other style heads, 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ½ in. x 4 in.:
Smaller and shorter, 65 and 5 per cent off list
Larger and longer sizes, 65 per cent off list
Hot pressed sq. or hex. blank nuts, \$5.50 off list
Hot pressed nuts, tapped, \$5.00 to \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped, \$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive, 80, 10 and 10 per cent off list
Small sizes S. A. E., 80, 10, 10 and 10 per cent off list
½ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages, 80, 10 and 5 per cent off list
Stove bolts in bulk, 80, 10 and 7½ per cent off list
Tire bolts, 65, 10 and 10 per cent off list
Track bolts, carloads, 3c. to 3.25c. base
Track bolts, less than carloads, 4c. to 4.25c.

Upset Square and Hex. Head Cap Screws

¼ in. and under, 80 and 10 per cent off list
5/16 in. to ¾ in., 80 and 10 per cent off list

Upset Set Screws

¼ in. and under, 80, 10 and 5 to 85 per cent off list
5/16 in. to ¾ in., 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 per cent off list

Milled Set Screws

All sizes, 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets, \$2.25
Large boiler rivets, 2.35
Small rivets, 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$38; chain rods, \$36 to \$38; screw stock rods, \$41 to \$43; rivet and bolt rods and other rods of that character, \$36 to \$38; high carbon rods, \$43 to \$50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ¾-in. and 7/16-in., \$2.35 to \$2.40 base; 5/16-in., \$2.35 to \$2.40 base. Boat and barge spikes, \$2.35 to \$2.40 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c. to 3.25c. base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, 1 C., \$9.60; 15-lb. coating, 1 C., \$11.80; 20-lb. coating, 1 C., \$13; 25-lb. coating, 1 C., \$14.25; 30-lb. coating, 1 C., \$15.25; 35-lb. coating, 1 C., \$16.25; 40-lb. coating, 1 C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	54½	28	1/4 to 3/4	+ 3½	+ 22½
1/2 to 3/4	60	33½	1/2	36½	18½
1/2	65	50½	3/4	42½	27½
1	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld			Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	50½	33	2	40½	27½
1/4 to 3/4	56	38½	2½ to 4	43½	31½
1/2	62	50½	4½ to 6	42½	30½
1/2	67	56½	7 to 8	35½	23½
1 to 1½	69	57½	9 to 12	30½	18½
1 to 1½	70	58½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
Inches	Discount	Inches	Discount
1½ in.	26½	1½ in.	5
2 to 2½ in.	41	1½ to 1¾ in.	15
2½ in.	52	2 to 2½ in.	25
3½ to 13 in.	57	2½ to 3 in.	30
		3½ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
Nos. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mil Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	No. 30½ and 31	3.10

PERSONAL

F. J. Griffiths resigned Jan. 1 as vice-president and works manager of the Central Steel Co., Massillon, Ohio. He has been succeeded as works manager by Benjamin Fairless, who has been plant superintendent. His successor as vice-president has not yet been named.

Herbert F. Topp has withdrawn as a partner from the firm of Crocker Bros., commission merchants in pig iron, coke and alloys, with which firm he has been connected since 1913; all of this time having been in charge of the Cincinnati office. Mr. Topp will continue his connection with the iron and steel industry, having organized the firm of Herbert F. Topp & Co., to carry on a commission business in pig iron, coke and alloys. The offices of the company are located at 1020 First National Bank Building, Cincinnati.

Claude Sauzedde has joined the engineering staff of the Maxwell-Chalmers Motor Car Co., Detroit, as designing engineer. He was the original designing engineer of the Dodge Bros. Co.

A. E. Ackerman, Brattleboro, Vt., plant of the Millers Falls Co., Millers Falls, Mass., small tools, has accepted a position as sales representative for the company in the Middle West.

B. G. Roos, former managing engineer Locomobile Co. of America, Bridgeport, Conn., and more recently auto-engineer Pierce-Arrow Co., has resigned the latter office to return to the Bridgeport company as chief engineer.

John Robson, Waterbury Tool Co., is scheduled to address the Waterbury branch of the American Society of Mechanical Engineers at the Chamber of Commerce Hall, Waterbury, Conn., Jan. 10, on the Waterbury hydraulic variable speed gear.

J. H. Hackenburg, purchasing agent Pressed Steel Car Co., Pittsburgh, has resigned and J. B. Tate has been made assistant purchasing agent, and will have charge of the department pending the appointment of Mr. Hackenburg's successor.

Theodore A. Gessler, for the past 13 years manager of sales of the American Sheet & Tin Plate Co., New York, resigned Jan. 1. Mr. Gessler has been identified with the sheet and tin plate trade since 1898, at which time he became associated with the American Sheet & Tin Plate Co. in its New York office. He is succeeded by E. E. Winckler, who has been assistant manager of sales in New York since 1909. Mr. Winckler has been associated with the American Sheet & Tin Plate Co. since its organization 22 years ago and previously represented the Cambridge Iron & Steel Co., Cambridge, Ohio, in the East, with headquarters in New York.

W. S. Stothoff has been appointed works manager of the Hadfield-Penfield Steel Co., Bucyrus, Ohio. He was at one time associated with the Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Gregory Brown has resigned his position in the engineering department of the Norton Co., Worcester, to join the sales engineering department of the Bridgeport Brass Co., under the direction of Carl F. Dietz. Mr. Brown has been active in the National Machine Tool Builders' Association as head of the safety code committee and active also in the American Engineering Standards Committee in connection with grinding wheel standards.

Edward Worcester, who retired as vice-president in charge of sales of the National Tube Co., Pittsburgh, on Jan. 1, and who is to make his home in the East and serve the company in an advisory capacity, was tendered a farewell dinner at the William Penn Hotel, Pittsburgh, Thursday evening, Jan. 5, by his former associates in the general offices and by the mill managers. William B. Schiller, president National Tube Co., was toastmaster.

Joseph M. Merrow, president Merrow Machine Co., Hartford, Conn., last week was tendered a dinner at the Hartford Club following his return from a three months' business trip abroad.

Lawrence K. Slaback has been appointed assistant manager of sales of the American Sheet & Tin Plate Co. in Cincinnati. Mr. Slaback has been associated with the company since its organization in 1900.

Vincent Massey has been elected president of the Massey-Harris Co., Toronto, to succeed the late Thomas Findley, and Joseph N. Shennstone, vice-president of the company, was elected to the office of chairman of the board of directors. Thomas Bradshaw, general manager, will act as the company's chief executive officer. The new head of the Massey-Harris Co., who is promoted from the post of secretary and director, is in his thirty-fifth year.

J. J. Bennett has been appointed purchasing agent of the Illinois Central Railroad Co., succeeding W. A. Summerhays, resigned to become lumber and tie agent.

Lloyd Jones, chief engineer United Engineering & Foundry Co., Pittsburgh, has resigned. He has been with that company for about nine years, having become chief engineer when F. C. Biggert was elected president a few years ago. His successor has not yet been named.

W. B. Wachtler, until recently manager of the Chicago district for the industrial bearings division, Hyatt Roller Bearing Co., has been promoted and transferred to the New York headquarters of the division as engineer in charge of general applications.

Norman F. Brown has tendered his resignation as director of public works, City of Pittsburgh, to form an attachment with the Dravo Contracting Co., general contractor, designer and builder of inland waterway-harbor-floating and terminal equipment. Mr. Brown has been elected vice-president and director of the company. Prior to his connection with the City of Pittsburgh, Mr. Brown was assistant to the chief engineer of the Pennsylvania Railroad. During the war he served as major in the American Expeditionary Forces, Transportation Corps, United States Army, under Brigadier W. W. Atterbury.

Edwin C. Bindley was elected president of the Neely Nut & Bolt Co., Pittsburgh, to succeed his father, the late John Bindley, at a meeting of the directors of the company, Jan. 4. Ray A. Lackner was elected vice-president, treasurer and general manager and Albion Bindley, secretary.

Wadsworth Doster, formerly sales manager Sundh Engineering & Machine Co., 1105 Frankford avenue, Philadelphia, manufacturer of finishing machinery for brass, copper and steel strip mills, has been elected vice-president of the company.

Dean R. Wilson has resigned as vice-president and treasurer of the Carbon Steel Co., Pittsburgh.

J. A. Connelly, manager of the Tampico, Mexico, office of the Petroleum Iron Works Co., has been appointed sales manager, with headquarters at Sharon, Pa.

John W. Gage, vice-president General Steel Co., Chicago, has been appointed general manager of the H. G. Saal Co., manufacturer of dies and spring motors, 1810 Montrose Avenue, Chicago. Mr. Gage retains his connection with the General Steel Co. as vice-president, although he will no longer participate actively in the direction of its affairs.

Stewart Malcolmson has been appointed superintendent of stock and director of production at the Anderson Foundry & Machine Works, Anderson, Ind., succeeding Phillip Rhinehart, resigned to take a position with an Indianapolis company.

John C. Neale, vice-president and general manager of sales of Midvale Steel & Ordnance Co., Philadelphia, will return this week, accompanied by Mrs. Neale, from a European trip.

J. J. Porter, who for a number of years was connected with J. G. White and other interests in the purchase and handling of equipment for public service companies, returned to New York last week after a

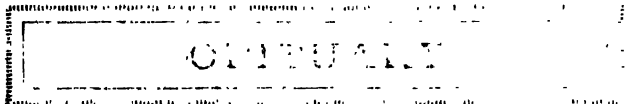
six months' tour of European countries. In his investigation of the possibilities of trade with Western and Central Europe and the Near East he represented a group of American manufacturers.

Glenn D. East, formerly connected with the Cleveland Metal Products Co., Cleveland, has been appointed Cleveland district sales manager of the Newton Steel Co., Youngstown, Ohio, succeeding Howard Kenworthy, who has become connected with the Trumbull Steel Co., Warren, Ohio.

W. P. Chinn, who has been assistant general manager of mines of Pickands, Mather & Co., Cleveland, with headquarters at Duluth, has been promoted to the general managership. C. H. Munger, whom Mr. Chinn succeeds, has been both manager of the mines and secretary of the mining companies which his firm controls, and because of his duties as secretary, has been located in Cleveland for the past two years. W. A. Rose, who has been chief mining engineer of the firm, has been promoted to the assistant general managership, succeeding Mr. Chinn.

Park R. Backman has been appointed a district sales manager of the Youngstown Pressed Steel Co., Warren, Ohio, in the territory embracing western Pennsylvania, western New York and West Virginia, assuming his new duties on Jan. 15. His headquarters will be at the home offices of the company, where the plant is located. Mr. Backman has been for a number of years secretary of the Valley Housing Corporation, Sharon, Pa.

Judge Samuel L. Black, Columbus, Ohio, was re-elected president at the annual meeting of the directors of the Pittsburgh Tin Plate & Steel Corporation, in Marietta, Ohio, Jan. 6. A. V. Somers was re-elected vice-president, treasurer and general manager, and O. G. Toner, Eden, Ohio, was named secretary, succeeding A. W. Stump of New York.



WILLIAM CROCKARD, who retired as superintendent of the Riverside Iron Works, Wheeling, W. Va., in 1907, after a service of 33 years, died at his home in Ashland, Ohio, Jan. 3. He was born in Wheeling 71 years ago. He was the father of Frank H. Crockard, president of Woodward Iron Co., Woodward, Ala.

ROLLIN JESSE PLUMB, aged 68, president Eagle Lock Co., Hartford, Conn., died Jan. 5 at his home in Terryville, Conn. He started with the company as an office boy and became its president in October, 1903. He was a director of the Bristol National Bank, the American Trust Co. of Bristol, the Bristol & Plainville Tramway Co., the South Norwalk Lock Co., and the Graham Mfg. Co., Derby.

ADOLPH TREPTE, president Globe Wire & Iron Works, Milwaukee, Wis., was found dead at his home on Jan. 5. He had been shot above the heart and is believed to have been murdered.

DAVID D. KELLEY, treasurer Homestead Iron Works Co., ornamental iron, Homestead, Pa., died at his home in Sheridan, Pittsburgh, Jan. 1. He was born in Huntingdon County, Pa., 69 years ago, but had been a resident of Pittsburgh for the past 40 years.

EDWIN D. LOWELL, secretary and purchasing agent American Fork & Hoe Co., Cleveland, died Jan. 9 after a week's illness, aged 49 years.

The Interstate Commerce Commission has extended from Jan. 5, to May 5, tariff schedules which proposed increased rates on fire brick and clay articles from stations on the Pennsylvania Railroad, Rolfe to Kane, Pa., inclusive, to points on the Lehigh Valley Railroad, taking New York and Philadelphia rates. The proposed tariffs would have increased the rates from the points of origin mentioned from 20½ to 21c. per 100 lb., to Philadelphia group points, and from 23 to 24c. to New York group points.

TARIFF HEARINGS NEAR END

Doubt Whether Schedules Will Be Prepared by Feb. 15—The President's Position

WASHINGTON, Jan. 10.—The hearings on the tariff have nearly ended, and while there have been some prospects that important tariff schedules would be prepared by Feb. 15, this belief is not shared by some prominent members of the Senate. It is generally conceded that preparation of the tariff will require considerable time because of the difference prevailing as to the question regarding the system of valuation. It is a foregone conclusion that regardless of what plan is adopted, it, as well as the entire bill, will be the object of prolonged argument in the Senate as has been true of all tariff bills.

It is stated that the recent White House conference of the President and Republican leaders did not reach an agreement as to the system of valuation, though it is confidently believed that it will have some relation, if not a direct one, to the American valuation plan. The President is said to have insisted that he be given more authority than is provided in the House bill in the administration and application of a home-value policy. As an instance of what the President has in mind, it is pointed out that the House bill would permit him to raise or lower duties a maximum of 20 per cent from the schedule rates to meet emergencies or as a basis for working out reciprocal agreements with other governments. Among proponents of this system are steel manufacturers, who made representation in behalf of such a reciprocal legislation through the Consolidated Steel Corporation.

President Harding is said to have told the conference that a 50 per cent reduction or increase should be provided to cover all future requirements. He also is said to have repeated recommendations made to Congress regarding the empowering of the Chief Executive with authority to fix flexible duties upon the recommendation of the Tariff Commission.

Despite the failure of the conference to agree on the valuation plan, information obtained by THE IRON AGE as to a current survey of proposals for tariff revision indicates that the recommendations of the Administration, through the Treasury Department, will call for the establishment of the American selling price of imported articles as the basic principle of tariff assessment. It is generally admitted that majority leaders in Congress and leaders of the executive branch of the Government will recommend an American valuation plan in some form, but considerably modified because of the widespread opposition and the difficulties to the Administration which the original plan would involve.

THE IRON AGE is also advised that a way has been found around the question of constitutionality of the proposed flexible tariff plan, which has provoked concern in legislative circles, as it involved the transfer of rate-making power, in part at least, to the executive branch. It is believed that the Treasury will recommend legislation which will give the President power to proclaim assessments at rates based on the American valuation for American-made products whenever it is found, after investigation by the Tariff Commission, or some other body, that American industry does not derive sufficient protection.

There is under consideration a proposal to define the American value of the imported article as the foreign value (cost abroad), plus handling charges and duty, plus the importer's overhead and profit.

Should it be determined, however, that the duties are not sufficient to offset foreign competition, resulting in hardship for domestic producers, the amendments under consideration would authorize the President to require the Tariff Commission to investigate and report to him. If the inquiry showed the need for protection, it would then be in the power of the Chief Executive to proclaim the assessment at the prevailing rates, but with the valuation method changed to the American wholesale selling price of a similar or comparable article of American manufacture.

SHORT TRADE ITEMS

The Placid Petroleum Co., Wichita Falls, Texas, incorporated to manufacture spark plugs, is preparing to have the parts manufactured and is in the market for shells, insulators, electrodes, etc., in limited quantities until it can get in touch with the manufacturers who will assemble the parts for the company.

The Banner Die, Tool & Stamping Co., Columbus, Ohio, organized last month, is a reorganization of the Old Cannon Die, Tool & Machine Co. It is operating in the same location.

Harry P. McCabe and P. Frank Sheeran, both well known in the machinery trade, have organized the McCabe & Sheeran Machinery Corporation and will deal in new and used machine tools, with office in the Singer Building, New York. Both have until recently been associated with the McCabe Lathe & Machinery Corporation, New York, one of the oldest of the machinery sales companies of the East. Harry P. McCabe was associated with his brother, J. J. McCabe, for 25 years prior to the latter's death three years ago, and since that time he has been vice-president of the McCabe company, as well as manager of machine-tool purchases. Mr. Sheeran had been associated with the McCabe company for 23 years, latterly as treasurer and



P. F. SHEERAN

chief of sales and advertising. The new company has acquired a stock of used machine tools, which is now being offered for sale.

The Orton & Stelbrenner Co., Chicago, manufacturer of locomotive cranes, clam shell, and orange peel buckets and coal crushers, has made arrangements with Walter Hasendahl, 1213 Fuller Avenue, Los Angeles, Cal., to represent the company.

Brile & Ratner, aluminum, 277 Broadway, New York, have opened a Chicago office at 53 West Jackson Boulevard for the convenience of the trade in Chicago and surrounding territory.

John F. M. Dellefson, 56 Murray Street, New York, on Jan. 1 opened an office as direct manufacturers' representative to the hardware jobbing and factory supply trade. He will travel for the Westcott Chuck Co., Oneida, N. Y. He was formerly engaged in a similar capacity by the Willis H. Simpson Co.

M. Cohn & Co., Inc., has changed its corporate name to Wallstein Industrial Corporation and has opened a new and spacious fireproof factory and plant at Evergreen Avenue and Cook Street, Brooklyn. The office and salesroom will be located in the Victoria Building, 230 Fifth Avenue, New York. The company will continue to manufacture Enduro black boning high grade, upset steels and wires, and metal specialties.

The More Handy Truck Co., 100 Rutledge Street, Brooklyn, N. Y., manufactures a handy truck adapted for carrying cans, kegs, barrels, and for general use.

The Headless Bolt Corporation, 414 Munsey Building, Baltimore, Md., does not expect to build for some time, but expects to contract. It has not as yet made contracts with any firm, but will send a sample bolt to any reliable firm which will be interested in the manufacture of bolts.

The Surway Signal Co., 221 Decatur Street, Corning, N. Y., intends to manufacture under contract small household utensils, but expects to let out on a royalty contract its line of automobile signals, as it is not properly equipped to manufacture these signals. The company is anxious to get in touch with a reliable firm to do this work.

George White & Co., Inc., 1 Exchange Place, Jersey City, N. J., was formed to take over the business of George White, that city, which was established in 1893 for the making of special machinery and tools. The company has purchased a large plant in Paterson containing 40,000 sq. ft. of floor space and is removing the machinery from Mr. White's Jersey City plant. The machinery is now being installed and the company expects to be in operation next month. Much new equipment will be needed, but the company has not yet figured on its requirements. The specialty will be the designing and building of special automatic machinery for the reduction of labor—the production of fine tools and dies and articles manufactured on a contract basis. The

officers of the company are: George White, president; A. R. Dunn, formerly with Andersen, Meyer & Co., Ltd., of China, vice-president; J. J. Dun, secretary and general counsel, and Edward R. Kresy, formerly general manager William Steiner & Sons, New York, treasurer. The company expects to maintain a district sales office in Jersey City at 703 One Exchange Place.

The Miller-Jones Corporation, 427 Oneida Street, Syracuse, N. Y., has taken over the manufacturing plant already established and having a large part of its equipment on hand. A little later the company will erect additional buildings and buy additional equipment. The company manufactures sheet metal specialties and has been very busy during the past depression.

The purpose of the recent incorporation of the Southern Metal Works, Shelby, N. C., was to obtain enough capital to enlarge production and to exploit new territory. No additions are contemplated. The company manufactures besides Babbitt metals are solder, parts for certain makes of automobiles and inner tube patches.

W. J. Early & Sons, Ltd., 804-812 Sarah Street, S. E., Pittsburgh, expected to be incorporated by Jan. 1, when its new name would be W. J. Early Sons Foundry Co. No plant changes will be made. John N. Early, chairman of the old company, will be president of the new company; other offices will be filled later. The company makes machinery and rolling mill castings, glass molds, plungers, charcoal chilled semi-steel and other special mixtures.

The American Casting Co., 324 Coit Street, Irvington, N. J., recently purchased the entire foundry equipment of the Aluminum Goods Mfg. Co. and expects to build in January, if the weather permits. The company will not be in the market for machinery for some time.

The Pennsylvania Heater Corporation, Third and Main streets, Irwin, Pa., is contracting for the building of its boilers with the Fisher Mine Equipment Co., West Newton, Pa. The outlook is that the Fisher company will not be able to complete the boilers fast enough, as the demand is great. The boilers are steam and hot water, using gas for fuel.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed the Allen Engineering Co. Boston sales agent for its rotary pump line. The company has sales offices at 113 Pearl Street, Boston, and specializes in the marketing of pumping and general power plant machinery. E. B. Allen, the head of the company, is a graduate of Harvard University, class of 1908, and has been connected in the past with the engineering department of the Buffalo Forge Co., the International Pump Co. and the Allis-Chalmers Co.

The Pittsburgh district sales office of E. J. Lavino Co., Philadelphia, ferroalloys, Edwin C. Foster, resident manager, is located at 1922 Oliver Building. Associated with Mr. Foster are D. M. Thorp and H. W. Grigsby, formerly attached to the company's general offices in Philadelphia.

R. C. Feltes and E. L. Beisel have organized the Chicago Grinding Machinery Co., Machinery Hall, Clinton Street and West Washington Boulevard, Chicago, to deal in grinding machinery and accessories, including ball bearing race grinders; bench grinders; center, centerless, chaser, chucking, cutter and reamer, cylindrical die, disk, drill, electric tool post, face, gage, gear, internal, portable, radial, ring wheel, snagging, surface, swing wheel, universal, and valve grinders. Mr. Feltes will also continue to act as the Chicago representative of the United States Electric Tool Co.

On Jan. 12, the J. W. Paxson Co. will occupy new buildings at Nicetown Avenue and D Street, Philadelphia, where, with increased facilities, it will continue to manufacture foundry machinery, supplies and facings. For distribution it has increased capacity for shipment by barrel, truck or carload.

Gibbons Bros., Ltd., Dudley, Worcester, England, has been appointed representative of the W. S. Rockwell Co., furnace engineer and contractor, 50 Church Street, New York, for the British Isles.

The M. P. Lyons Iron Works, Inc., Manchester, N. H., structural and ornamental work, has opened a Boston office at 6 Beacon Street. G. S. Walls and J. K. Carpenter represent the company.

The general offices of the Cote Brothers Mfg. Corporation, maker of Simplicity refillable pens, are now located in larger quarters at 1425 First National Bank Building, 38 South Dearborn Street, Chicago. Thomas F. Cote, president of the company, is at present in the East, personally directing the sales policy in that territory.

The American Motors Service, lock box 447-NB, Pittsburgh, has been formed by G. B. Burroughs, L. E. Connelley and J. C. Burroughs, Toledo, Ohio, and other associates for the purpose of leasing a chain of service stations and distribution of gears, parts, accessories and particularly complete tools and equipment for private garages. Correspondence with all interested manufacturers is desired.



HARRY P. McCABE

THE YEAR IN CANADA

Industrial Conditions Much Like Those in the United States Prevailed

Throughout the greater part of the year 1921 the tide of Canada's industrial activity was at its lowest ebb in several years and the movement of raw and finished iron and steel materials was at a minimum. As a matter of fact, it appears that the iron and steel industry bore the greater part of the brunt of the depression which was felt in varying degrees by all producing and selling concerns of the Dominion. The first three quarters of the year were exceptionally quiet, both with regard to productive operations and building enterprises. Companies did very little in the way of building plant additions or installing machinery and equipment to increase production, and although a number of concerns were contemplating building plants in the Dominion, only a very small percentage of these undertook the work during the year. Steel plants and foundries had many difficulties to contend with, among which was the almost entire falling off in demand for the commodities they produced. The steady decline in prices of iron and steel material likewise had its effect on producing companies, many of which had contracted for their raw materials at the high prices prevailing in 1920 and as a consequence with each slump in price in the finished material producers found it necessary to take the inevitable loss in order to meet outside competition.

Many Idle Furnaces

Early in the year 1921, steel plants experienced a decided slump in demand for all lines of finished iron and steel and at the same time they had few orders on their books and as a consequence the curtailment of operations was necessary on a fairly large scale. Foundries and other concerns using products from the mills were up against the same proposition and they in their turn cut down activities to a very small percentage of normal operations; in fact, a number of the larger firms were forced to close down their plants entirely. Blast furnaces were dealt a rather severe blow by the cutting down of the demand for iron and around the first of last May all pig iron producers had large

stocks of foundry and malleable iron in stock piles and as a consequence blew out their furnaces and from May until November, out of 20 furnaces in Canada only five were actively engaged in the making of pig iron. These were turning out basic iron for the use of the companies producing.

The cessation in demand for iron and steel during the early months of the year not only had the effect of forcing producers to curtail productive operations but was also reflected in prices of material. Price cutting which was first started in the United States rapidly made its way to the Canadian side of the border and to meet American competition, Canadian producers found it necessary also to meet the prices and as a consequence each cut in price made by United States mills was met with a corresponding revision by the Canadian producing interests. Labor difficulties slowly became of a minor character in the life of the iron and steel business and despite the fact that wages were reduced from time to time there was but little outcry from those affected by the reduction. The cutting down of plant operations was reflected in a rather serious unemployment situation which is now being alleviated to some extent through the railways of Canada placing orders for steel rails and car repair work.

Outlook More Encouraging

Notwithstanding that the greater part of the year reflected a very backward state of affairs in general business conditions, the last two months brought forth a decided change for the better and at the close of the year the outlook was said to be fairly bright. Several large orders were recently placed by the Canadian Pacific Railway, the Temiskaming & Northern Ontario Railway, the Grand Trunk and the Canadian National Railways for steel rails, this business going to the Algoma Steel Corporation, Sault Ste. Marie, Ont., and to the Dominion Steel Corporation, Sydney, N. S. The rail orders will be sufficient to enable the two concerns mentioned above to keep their rail mills in operation throughout the greater part of the winter. Although Canadian railways are not placing contracts for new rolling stock, some good-sized orders were placed for car repairs, which were of sufficient volume to enable car plants at Fort William, Ont., Montreal, Que., and Amherst, N. S., to resume operations at their plants on something like a normal scale.

AUSTRIAN MARKET ACTIVE

Situation Now Resembles Recent German Activity —About 80 Per Cent of Machinery Exported

(Special Correspondence)

VIENNA, AUSTRIA, Dec. 12.—The improvement in the Austrian market which began in October has grown. Conditions, especially in export business, have improved considerably. The situation shows all the features of the German boom: enormous demand with prices climbing rapidly, scarcity of material; and a revival of exports. The price for bar iron, which was raised from 5000 to 6400 kronen toward the end of October, was increased to 8100 kr. on Nov. 1, when heavy sheets advanced from 5000 to 6800 kr. Dec. 1 brought a further rise, the new prices being 11,600 kr. for bar iron, 11,400 kr. for beams, and 11,600 kr. for heavy sheets, all per 100 kg. Merchants and jobbers are offering German bars at 12,000 to 14,000 kr. per 100 kg. Freight rates were increased 200 per cent on Dec. 1, and as other production costs are rising, a further advance of prices is expected.

As domestic producers are unable to fill orders, German materials, chiefly semi-finished and special material, are imported. On the other hand, German customers are known to have placed orders with Austrian rolling mills. Supplies from Czecho-Slovakia might relieve the pressure to a certain extent but the high exchange value of the Czecho-Slovakian crown is a stumbling block. Shipments are now restricted to special products not produced domestically or unobtainable in Germany. As shipments by the latter are on a

modest scale, there is a notable shortage of material in the domestic market as a large percentage of the output is being exported. Terms of delivery are five months and frequently longer. Some of the special steel works are stated to be sold out for the second quarter of 1922.

Attempts to Lengthen Work-Day

The 1921 output of pig iron is estimated at about 50 per cent of the pre-war figure. The Alpine Montan company has now three of its seven blast furnaces in operation and a fourth will probably be blown in next month. Production is on the increase, but a substantial increase of production seems out of the question until the housing problem is solved. The company is preparing an extensive housing plan, estimated to cost 4,000,000,000 kr. to be completed by the end of 1923, when it will be possible to add one-third to the present force of 16,500. The only other alternative to increase production is to extend the 8-hr. day. In this connection Hugo Stinnes, at a recent visit to the works, suggested at a meeting of works councils delegates and shop stewards that a liberal supply of foodstuffs would be guaranteed if the men would work a 9-hr. day. The men are on the whole inclined to accept the Stinnes proposition but the unions are less inclined to forego voluntarily the long fought-for 8-hr. day.

A feature of the present position of the manufacturing industry is the lively tone of the export market. There is a noteworthy demand for sheets and plates, especially by Rumania which is also in the market for other commodities. The iron ware industry has secured substantial orders from Poland, Jugo-Slavia, and the Balkan countries. The growing export of agricul-

tural implements and tools to Russia deserves mention. Holland, too, has lately been placing some fair-sized orders. Domestic sales are slightly less active, as merchants are still well stocked with material, particularly tools, cutlery and small hardware. Other commodities, such as screws, rivets, bolts, nuts, etc., have met with improved demand, attributed to greater activity in building and the engineering industry.

The locomotive, rolling stock, bicycle, motor and agricultural machinery builders report satisfactory employment and large profits. The rolling stock makers were awarded a large car contract by Bulgaria some time ago. Less satisfactory conditions prevail in the automobile industry where a recent slump in orders has reduced employment. It is safe to assume that about 80 per cent of the production of the engineering and machinery industries is being exported.

The Veitscher Magnesite Works in its annual report comments upon the slump in export shipments, which amounted to 48,000 tons compared with 112,000 tons before the war. Shipments to the United States in particular show a marked decline with 3600 tons against the pre-war figures of 50,000 to 60,000 tons. The proposed American duty of \$15 per ton would effectively bar further imports of Austrian magnesite and even a reduction to \$10 or \$5, it is stated, would render the Austrian product only competitive.

Ireland's First Steel Plant an Electric Steel Foundry

Ireland has recently put in operation its first steel foundry. Sutherland, Ltd., Sydenham Road, Belfast, has installed a 1½-ton Electro-Metals electric furnace which was started up on Dec. 3, 1921, when steel was made for the first time in Ireland, according to the *London Iron and Coal Trades Review*. The new foundry is located adjacent to the company's shipyards. The main steel foundry building has a floor space of about 14,000 sq. ft.

The new furnace is of the type known as Greaves-Etchells in the United States, is basic lined and has two 8-in. graphite electrodes, equipped with economizers. The furnace is connected to transformers having a total capacity of 800 k.v.a., which are designed for 3-phase, 50-cycle, 6500-volt current on the primary side, while the secondary delivers 2-phase current to the furnace at 90 or 70 volts.

It is believed that the establishing of this plant in Belfast will be of advantage to the engineering industry of Ireland as all steel castings have heretofore come from Great Britain or the United States.

Novel Export Plan for German Wire Ropes

An export organization of a novel kind is proposed by the Economic Association of German Wire Rope Works, Düsseldorf, for the purpose of promoting the export trade and thereby enabling Germany to obtain foreign currency to pay her indemnity with, says the *London Iron and Coal Trades Review*. The scheme proposes in the first place that German works obtaining an order from abroad shall receive a commission of 5 per cent on the order in the currency of the country for which it has been booked. In addition to this, the works in question is to be allowed to book one-fourth of the order without this quantity being deducted from its allocation in the association, and, of course, also one-fourth of the amount of the invoice. The remaining three-quarters of the order is to be divided among the constituents in such a way that 75 per cent of the three-quarters is distributed among all the constituents of the association in proportion to the number of workmen employed by the various concerns at the end of 1919, while the remainder of 25 per cent is to be divided among all the works in equal shares irrespective of the size of the different plants. It is claimed that this scheme would render it possible for 70 per cent of the amount of the bills of exchange obtained through foreign orders to be placed at the disposal of the Government, and mutual underselling of the various concerns abroad would be stopped.

It is explained that the situation of the German

wire rope industry has been such that, owing to the ruthless price undercutting in the markets abroad, the obtaining of orders at rates in foreign currency has been largely prevented, and as a rule export prices were consequently forced down to the level of inland prices. Under the pressure of the competition of German non-associated firms, the members of the association, who until then had faithfully observed the rule to sell only in foreign currency for export, were compelled to drop their allegiance to the association since last March, and to invoice their goods in marks. Under the proposed scheme, however, as almost all the makers of wire ropes have now joined the association, it is calculated it will be possible to sell in foreign currency in every case and obtain substantially higher prices abroad.

Russian Soviet Government's Plan of Leasing Steel Plants to Capitalists

More details are now to hand of the Soviet Government's scheme of leasing iron and steel plants to foreign capitalists, says the *Metal Bulletin*, London. The original plan was for 6-year leases, but the period has now been extended to 20 years, although this is also generally considered to be too short. Only second class works were included at first, but now first class plants are offered. Up to the present, however, foreign capital has not been attracted to any important extent. The following works are offered on lease:

Dnipro-Co - Pig iron, steel, rails, sheets, wire, etc., structural iron, foundry and railroad material

Donetz Iron & Steel Co. - Iron and steel works, wire and sheet rolling mill

Donetz-Yuzovskiy Co. - Pig iron, sheets and wire

Nikopol-Marupol Co. - Blast furnaces, steel and rolling mills. Controls rich manganese ore fields.

South Russian Dneprovsk Metallurgical Co. - Pig iron, bar iron, railroad material and pipes.

Kramatorski Metallurgical Co. - Pig iron and ferromanganese. Owns large machine-shops

New Russia Co., Hughesovka - Pig iron and steel works. Specializes in bridgework

Krivoi-Rog Iron Co. - Pig iron

Various machine-shops, municipal tramways and electrical undertakings are also offered. The conditions of lease are as follows:

1. The concessionaires undertake to raise output to a previously fixed level

2. Output to be divided as follows: 60 per cent reserved for home market, 20 per cent acquired through the commissary for export trade, 10 per cent bought by the State to furnish stocks for home trade, 5 per cent reserved for the Soviet as landlord, and 5 per cent distributed as premium.

3. The government's portion of the net profits to range from 20 to 50 per cent, according to the importance of the industry

4. Concessionaires to be granted every relief necessary for the safety of the industry, while on their side they are responsible for the food supply of their employees.

5. Preference to be given to the old owners of the works or, failing these, to their employees.

Belgian Industrial Revival

WASHINGTON, Jan. 10.—The Belgian industrial revival is being maintained in spite of the usual slackening of business due to annual stock taking and a somewhat smaller holiday trade than is usual at this season, says the Department of Commerce in a survey of that country's business conditions. Unemployment shows a considerable decrease, particularly in the metal industries.

An encouraging decrease in unemployment has proceeded steadily since October. Conditions in the metal industries are generally favorable, and iron and steel production has shown a considerable increase as a result of the relighting of a number of blast furnaces and the resumption of activities at the Ougree-Marihayne plant, which has been practically closed for some time due to a strike among the employees. On account of increased rolling mill production, prices of finished steel, which advanced during November, are now stationary. Pig iron advanced 5 francs per ton, and finished iron about 10 francs per ton during December. Semi-manufactured products also show an upward tendency. Bessemer 5 mm. sheets advanced 2.50 francs,

and open-hearth 5 mm. sheets 3.20 francs during the month. Orders are difficult to place for delivery under three months.

The arms industry is not sharing the prosperity of other mechanical lines, but the largest Belgian plant,

the Fabrique Nationale, has received a Japanese order for arms and ammunition which will probably supply work for additional equipment. Automobile manufacturers producing 10 to 15 hp. cars have reported an increased business.

German Machinery Trades Generally Quite Active

Machine Tool Industry Has Enjoyed Good Business, Though at Low Prices, and Other Lines, Including Locomotives, Are Active

(Special Correspondence)

BERLIN, GERMANY, Dec. 16, 1921.—The position of the German machine industry has undergone a further improvement during the past two months and the recent notable appreciation of the German currency has not had any apparent effects upon business as yet. Export orders, though substantial, are by no means as extraordinary as might seem to be the case, while domestic business, on the other hand, has markedly improved and is forming a feature of some branches. This applies especially to textile machinery, the strong demand for which finds an explanation in the present unprecedented demand for all kinds of textiles.

Satisfactory buying is also noticeable in the agricultural machinery and implement market, where domestic and foreign orders are in even proportion. Manufacturers of agricultural machinery and implements interested in the export business have combined into an export association for the principal purpose of working the South American market. Domestic buying is the more remarkable in that fall and winter are generally considered the dead seasons and requirements are by no means urgent but are primarily representing surplus capital investments. Export business centers chiefly on Rumania, Switzerland and Holland.

Machine Tool Prices Unsatisfactory

Regarding the machine-tool industry, unsatisfactory prices have been the chief cause of complaint during the past months, but a betterment in this respect is now being reported and attributed to the increased demand. England and the Scandinavian countries have lately been in the market and are stated to have bought fair quantities; 29,725 tons of machine tools valued at 512,592,000 m. crossed the frontiers during the May-September period of 1921, and nearly 20 per cent found their way to Belgium, while 982 tons were taken by South America. Other important buyers were France and Italy. An important works of this branch, the Reinecker Aktien Gesellschaft, at Chemnitz, manufacturers of milling machinery, taps, etc., states that present orders are without parallel in the history of the works.

Large Locomotive Contracts Closed

The locomotive industry has been awarded contracts by the Balkan countries and a short while ago the Rumanian Government ordered 30 locomotives valued at 130,000,000 m. with the Henschel & Sohn concern, Cassel. Some interesting particulars have lately been announced in regard to the Russian locomotive orders by the Karlsruhe Engineering Works. The total number of engines ordered by the Soviet Government with the German industry is given at 700, distributed among 19 companies. Eighteen engines each were placed with the Krauss & Co. works, Munich, the Karlsruhe Engineering Works, and the J. A. Maffai works, Munich. The Esslingen Engineering Works booked 16 engines and the Henschel & Sohn were given the largest order with 137 engines, the total orders thus placed with works in the fifth district amounting to 207 engines. With 8448 tons out of a total of 18,633 tons shipped abroad, the Balkan countries have a clear lead in this department. The total value of locomotives exported during the period under consideration is given at 484,422,000 m.

One of the branches operating to the limit of ca-

pacity is that devoted to rolling stock, which has lately been awarded several Dutch orders and an Argentine order, the latter comprising 70 cars valued at 230,300 pes. and booked by the Linke-Hofmann Works. Belgium imported the bulk of exports with 7832 tons followed by Holland with 5842 tons, out of a total of 28,141 tons, the latter valued at 295,351,000 m. The comparatively large export to southeastern Asia (i. e., British India, Malacca, Ceylon, French, Dutch and Portuguese Indies, Philippines, Siam), viz., 4360 tons, deserves attention. Broadly speaking, the car works are booked up to fall of 1922.

Bicycle Industry Shows Gains

Another industry where conditions are prosperous is the bicycle industry. According to a statement by the Triumph company, Nuremberg, all departments "are flooded with orders." Holland and the Scandinavian countries are still the best customers, the former having imported 2021 tons and the latter 598 tons, of a total of 4527 tons, valued at 259,375,000 m. (not including motorcycles). Brisk activity prevails in the automobile industry, which is well stocked with orders as a result of the success of the last exhibition and races. Exports during May-September fluctuated around 600 cars per month, the total shipped amounting to 3172 cars equal in weight to 6119 tons and valued at 284,264,000 m. These figures include finished cars, chassis with motors, as well as flying machines and airships (dirigibles) though the latter two groups may be disregarded for all practical purposes. Holland imported 944 tons, Spain 492 tons, Sweden 416 tons. American imports were as follows: United States 353 tons, South America 168 tons, and the rest of America 112 tons; 291 tons were shipped to southeastern Asia.

Exports from Germany Decline

WASHINGTON, Jan. 10.—Exports from Germany for the month of November showed a slight decrease, as compared with the previous month, according to a cable message to the Department of Commerce from Commercial Attaché C. E. Herring, dated Berlin, Dec. 30. The decrease in imports was more noticeable, with the result that November showed a greatly diminished trade balance by volume. Iron and steel exports showed a decline of 4.8 per cent; coal, coke and other mineral fuels, except oil, 2.8 per cent; and zinc and zinc products, 12 per cent. Machinery exports showed an increase of 5 per cent.

The total exports during November amounted to 19,079,000 double centners, valued at 11,912,000,000 paper marks, whereas in October they amounted to 19,700,000 double centners, valued at 9,700,000,000 marks. During November, German imports totaled 25,380,000 double centners with a value of 12,278,000,000 paper marks, compared with an October import of 30,000,000 double centners, valued at 13,900,000,000 marks.

The decrease in the adverse trade balance by volume which is shown in the figures given above for October and November was due in part to the abnormal imports of raw material during the former month, caused by the anticipation of further decline in the value of the mark as well as to the expected increase of import duty. Higher export prices are also an im-

portant factor in considering the trade balance as the value of practically all exports increased even where the volume declined. The total gold value of German exports for the month of November was much less than in October, it must be remembered, on account of the fall in exchange.

SWEDISH PRICES LOWER

New Quotations Lower—Production Declines— Ore Exports Increase

STOCKHOLM, SWEDEN, Dec. 10.—The new Swedish iron prices show a decline compared with quotations toward the end of October. Prices given are per metric ton, f.o.b. Swedish port, and converted into dollars at 4.28 kr. to the dollar.

Export pig iron	\$37.98
Rollers	\$89.02 to \$100.89
Wire	100.89 to 112.76
Bar, open-hearth	53.41 to 58.16
Bars, Lancashire iron	74.78

Swedish iron and steel production from January to October, 1921, shows a steady decline. Output of pig iron during that period was 274,000 tons as compared with 376,000 tons in the corresponding period of 1920, while the respective figures for rolled products were 95,000 tons against 256,000 tons. Of the 134 blast furnaces in Sweden, only 21 have been active. Export shipments of iron have decreased about 50 per cent. During the first ten months of 1921, 117,000 tons were shipped against 230,000 tons in 1920. Exports of iron ore have increased, amounting to 3,750,000 tons compared with 3,260,000 tons in 1920.

Cold Rolled Strip Rolls of Narrow Face

The United Engineering & Foundry Co., Pittsburgh, recently produced on two orders for cold strip equipment nine stands of 8-in. mills, one calling for 12-in. face and the other for 10-in. face of rolls. These are the smallest the company has manufactured to date, having previously built only 12-in., 16-in. and 20-in. mills. The smaller mills follow the general design of the larger sizes. One of the 8-in. mill orders was built with a two-to-one variable speed motor and a roll speed of 97 to 194 ft. per min., and the other with a three-to-one motor and a roll speed of 62 to 186 ft. per min. Where they are used as single stands, constant speed motor may be used, but when used as tandem mills, variable speed motors are required to prevent pulling or excessive sagging of the material between the stands.

The mill housings of the new mills are of cast iron and the mill fillings are steel castings lined with nickel bronze bearings for 6½-in. necks. Fillings are of the outside clamp type, making roll changing easy. The screws are of high carbon steel forgings with fine threads of small pitch and the screw boxes are of bronze.

A separate pipe and sight feed lubricator is provided for each bearing and pair of gears. These pipes lead from a reservoir mounted on the pinion housing and are kept supplied with oil by a circulating pump driven from an extension of the motor pinion shaft. The use of cut double helical teeth together with the elimination of the extra set of reduction gears is found to insure freedom from vibration and consequent marking of the strip being rolled.

Rates on Chrome Ore Suspended

WASHINGTON, Jan. 10.—In line with its policy of suspending the operation of tariffs reducing rates on iron, manganese and chrome ore, the Interstate Commerce Commission has entered an order suspending from Jan. 16 to May 16, schedules of the Bessemer & Lake Erie Railroad calling for reductions in rates on chrome ore. The rates were to apply on shipments from Bessemer, Pa., and other points, to Gary, Ind., South Chicago, Ill., Youngstown, Ohio, and Farrell and Sharon, Pa.

GERMAN CREDITS TO RUSSIA

Purchases Financed by Joint Banking Enterprise —Soviet Purchases Total 200,000,000 Marks

(Special Correspondence)

BERLIN, GERMANY, Dec. 15.—A credit agreement has been entered into between the Russian Soviet Government, represented by its Berlin commercial mission, and a German banking institute, the Deutsch-Osteuropäische Kreditbank Aktien Gesellschaft, at Elberfeld. The bank will change its name to Deutsch-Osteuropäische Wirtschaftsbank Aktien Gesellschaft and increase its present small share capital of 400,000 m. to 5,000,000 m. Members of this joint banking enterprise primarily recruit from the so-called Bergische iron and metal manufacturing industry, the principal centers of which are at Remscheid (tools), Solingen (cutlery), Velbert (locks and builders fittings), Hagen (small iron ware), Lüdenscheid (metal ware), etc.

The Soviet Government through its Berlin mission is placing orders with German firms to the value of 200,000,000 m. for a start. The financing of these purchases will be as follows: The mission will pay a certain percentage of the invoice amount in German marks against shipping documents and is credited with the rest by the bank, the latter receiving bills payable within 12 months at the latest. Simultaneously with the bills, the bank will be handed Russian treasury notes, equivalent in amount to the bills, to be deposited as securities only. The Reichsbank is reported to have expressed its readiness to discount such bills under certain conditions and one industrial concern is stated to be willing to guarantee payments. Further credit agreements of this kind with German financial circles are pending.

Higher Prices for Silica Brick

PITTSBURGH, Jan. 9.—Although demands for refractories are not particularly heavy, recent prices were resulting in such large losses on the low rate of plant operations that there has been quite a general movement on the part of makers to advance prices. The effort has not yet crystallized in fire clay brick, but has resulted in the establishment of a price of \$30 for Pennsylvania silica brick as compared with \$28, and even \$27, the basis of some business done in December. Magnesite brick after dipping to \$50 and in a few cases lower, now are not quoted at less than \$53 and there are intimations that fire clay brick prices soon will be marked up. Chrome brick are weak and \$5 per ton lower.

Manufacturers say that the higher prices on silica brick do not yield a profit unless they are able to operate their plants more fully than they did during most of 1921. If the advance stifles business, it is their contention that the plants might as well be entirely down as to be operated at such a low point as to make production costs high and profits impossible. Stocks of all kinds of brick in consumers' hands are said to be light and makers are figuring that this is going to mean a good business this year provided business in iron and steel makes the recovery it is expected to from the 1921 depression.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	\$30.00 to \$35.00	\$28.00 to \$30.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick:		
Pennsylvania		30.00
Chicago		35.00 to 37.00
Birmingham		40.00
Magnesite Brick:		
Standard size, per net ton		53.00 to 55.00
Chrome Brick:		
Standard size, per net ton		41.00 to 44.00

Standard drop forged wedges, finished in nickel plate, are being distributed to railroad officials by the Pollak Steel Co. The miniature wedges were drop forged in the company's South Chicago works, and are intended to serve as paper weights.

Machinery Markets and News of the Works

NEW YEAR IMPROVEMENT

Orders and Inquiries More Numerous in Some Selling Centers

New York School Board Buys 35 Lathes and Other Tools—A Few Railroad Orders

The New York City Board of Education last week placed orders for about \$200,000 worth of machine tools and supplies. The largest single order was for 35 Pratt & Whitney lathes. Another order covered about 20 woodworking machines. The bulk of the items, of which there were 3000, were small tools and supplies. The equipment is for vocational training schools.

The new year has brought some improvement in certain market centers. In Chicago, for example, dealers report that both orders and inquiries in the first week of January were "far more numerous" than in December. Cincinnati and Cleveland both report improvement. In the East there has been no marked change.

Railroad business continues to occupy first position in order and prospects. The Delaware, Lackawanna & Western Railroad is understood to have decided on the equipment it will buy against its recent inquiry

for about 40 tools. Formal orders are expected shortly. The Delaware & Hudson has taken no action on its recent small list. The Chesapeake & Ohio has bought several tools and is inquiring for a few special machines. The Louisville & Nashville has placed orders for a number of tools with Cincinnati builders. The Santa Fe has bought several tools at Chicago. The Illinois Central is in the market for a driving-wheel lathe and a timber sizer. The Pittsburgh & West Virginia Railroad has bought a Putnam car-wheel borer at Pittsburgh.

Industrial companies are not active buyers, but there are some prospects of business within the near future. The Johns-Manville Co. has received quotations on a list for its Waukegan, Ill., plant, and the bids have been forwarded to the general offices in New York, where final action will be taken, it is expected, within two or three weeks. The Phoenix Horse Shoe Co. has bought four tools at Chicago recently and is inquiring for a few more. The Streets Co., Chicago, which has specialized in the repair of wood cars, will equip a shop for repairing steel cars and has issued a list of 36 tools, mostly fabricating machines, and overhead cranes. The National Cash Register Co., Dayton, Ohio, is asking bids on a number of small machines. Several tools are wanted for schools at Ada, Ohio.

New York

NEW YORK, Jan. 10.

Formal orders have not yet been sent out by the Delaware, Lackawanna & Western Railroad against its inquiry of two or three months ago covering about 40 machines. It is expected that the orders will be issued shortly as tentative reservations of certain machines have been made. No action has been taken by the Delaware & Hudson Railroad against its recent small inquiry. The Chesapeake & Ohio Railroad has bought several tools and is inquiring for a few special machines.

The New York City Board of Education last week bought a large list of tools for vocational training schools, the largest single order being for 35 Pratt & Whitney lathes. Another order covered about 20 wood-working machines.

The Johns-Manville Co. has issued from its New York office an inquiry for the following machines, which is said to be a duplicate of the list recently inquired for in Chicago: Two sensitive drills, two emery grinders, two 20-in. upright drills, one No. 1 universal grinder, one 60-in. knife grinder, one 20-in. shaper, one pipe machine, one 30-in. open-side planer, one 9-in. hack saw, all motor driven.

The first week of the new year has not brought any material change in the local machine-tool situation. Inquiries are no more numerous and a relatively small amount of business is being booked. In some lines of tools an improvement started in December, which it is expected this month will maintain, but there is no marked change for the better.

The J. N. K. Machine Corporation, Jamestown, N. Y., of which Edward H. Johnson is president, has its new factory building well under way and will start operations about March 1. The company will engage in general contract machine work, also die and tool work, and is in the market for the following tools: One 36-in. x 10-ft. planer, one 20-in. shaper, one 20-in. drill, square base, one 20-in. x 10-ft. lathe.

The crane market shows no change the first week of the year. A few new inquiries for electric cranes have appeared and a number of small handpower cranes are pending. The four 5-ton electric cranes, 22 to 27-ft. span, for the Textile Finishing Machine Co., Providence, R. I., were placed with the Shaw Electric Crane Co. The New Jersey Foundry & Machine Co. is reported to have received the three 1-ton hand-power cranes.

The award of gantry cranes for the Stapleton, S. I., piers by the city of New York to the Wellman-Seaver-Morgan Co. was on item A of the specifications. This item calls for 26 2½- to 5-ton semi-portal gantry type electric cranes at about \$8261 each and eight 1½- to 2½-ton combination or Hamburg type cranes, with hinged auxiliary boom, at about \$13,702 each. The total price on the thirty-four cranes of this item is \$324,500. Delivery specified in 360 days, in which time cranes are to be erected and in operation. Delivery will probably begin about June. The McMyler Interstate Co. was the low bidder on a 2-ton roof crane for the large canal at Rochester, N. Y., bids on which were opened in Albany.

Among recent sales were: Industrial Works, a 30-ton, 40-ft. boom locomotive crane to the Great Northern Railroad, St. Paul, Minn.; Shepard Electric Crane & Hoist Co., two 1-ton, 25-ft. span, floor control, transfer cranes to M. E. Conran & Co., pipes and fittings, Brooklyn, N. Y.; three 1½-ton cranes to the York Mfg. Co., York, Pa., and a 10-ton, 40-ft. span overhead traveling crane with 3-ton auxiliary to the Atlas Powder Co., Wilmington, Del.

The Frederick Osann Co., 215 Seventh Avenue, New York, manufacturer of industrial sewing machines and parts, occupying two floors of the twelve-story building, has acquired the entire structure and will expand its facilities as soon as present leases expire in other parts of the building.

A vocational department will be installed in the new two-story and basement high school to be erected at Fulton, N. Y., and estimated to cost about \$415,000. Wilson Potter, 22 East Seventeenth Street, New York, is architect.

The Erie Railroad Co., 50 Church Street, New York, has awarded a contract to the Austin Co., 217 Broadway, for the erection of a one-story machine shop, engine house and boiler plant on Pavonia Avenue, Jersey City, N. J., estimated to cost about \$75,000. It will replace the former works recently destroyed by fire.

The Mutual Lamp Mfg. Co., Houston and Crosby streets, New York, manufacturer of electric lamps, occupying a portion of the building at the location noted, has purchased the entire seven-story structure, 65 x 120 ft. About 10,000 sq. ft. will be added to the present manufacturing department.

Burns Brothers, 50 Church Street, New York, will build a one-story coal pocket at 1032-42 Avenue A, 50 x 100 ft., estimated to cost about \$50,000, with equipment. Plans have been completed.

The Wilson Welder & Metals Co., Brooklyn, has removed its plant from 253 Thirty-sixth Street to a larger building at 132 King Street, for increased capacity.

The Boyertown Casket Co., 671 Eighth Avenue, New York, with plant at Boyertown, Pa., has broken ground for a six-story and basement branch works, 48 x 66 ft., at Lafayette Avenue and St. Felix Place, Brooklyn, estimated to cost about \$150,000. The H. P. Wright Co., 207 East Forty-third Street, New York, is contractor.

The National Power & Light Co., New York, has been organized under New Jersey laws by officials of the Electric Bond & Share Co., 71 Broadway, and the American Cities Co., New Orleans, to take over and operate properties of the latter organization, including the Birmingham Railway, Light & Power Co., Birmingham, Houston Lighting & Power Co., Houston, Tex.; Knoxville Railway & Light Co., Knoxville, Tenn.; Little Rock Railway & Electric Co., Little Rock, Ark.; and the New Orleans Railway & Light Co., New Orleans, La. A bond issue will be arranged at an early date and a portion of the proceeds used for extensions and improvements, including power plants, etc.

The Cunard Garage Corporation, New York, recently organized, has leased the three-story building, 25 x 200 ft., at 533 West Twenty-seventh Street, for an automobile repair and service works.

The Gulf Refining Co., 21 State Street, New York, has had plans prepared for a one-story machine shop, 100 x 232 ft., at its works, Doremus Avenue, Newark, N. J., estimated to cost about \$70,000.

A vocational department will be installed in the two-story and basement high school to be erected at Palmyra, N. J., contract for which has been let to George W. Shraner & Son, Palmyra. It will be 62 x 80 ft., and is estimated to cost \$150,000. James T. Weart is president of the board.

The New Jersey Refrigerating Co., 178-82 Ninth Street, Jersey City, N. J., will make extensions and improvements in its refrigerating plant to cost about \$25,000.

Motors and other electrical and mechanical equipment will be installed in the new printing plant to be erected by the American Book Co., 100 Washington Square, East, New York, on property recently acquired at Bloomfield, N. J., 220 x 500 ft. Plans will be prepared at an early date.

The Florence Pipe Foundry & Machine Co., Front Street, Florence, N. J., has broken ground for a one-story machine shop, 60 x 250 ft. C. L. Reeves is superintendent.

In connection with the plans for expansion, the Standard Underground Cable Co., 26 Washington Street, Perth Amboy, N. J., is considering the erection of a three-story machine shop, with wood-working department, about 150 ft. long. It is proposed to commence work early in the spring. Chauncey C. Baldwin is general manager at the plant.

The Haritan Copper Works, Perth Amboy, N. J., is perfecting plans for the manufacture of copper gutters, leaders, shingles and kindred specialties, and will soon commence the installation of machinery for this department. A Clayton Clark is superintendent.

The Board of Education, Summit, N. J., has awarded contract to Gustave De Kimpe, 141 Summit Avenue, West Hoboken, N. J., for a two-story and basement high school, 146 x 260 ft., to include a vocational department, estimated to cost about \$500,000. Guilbert & Betelle, 546 Broad Street, Newark, are architects.

The Board of School Estimate, County Vocational Schools, Court House, Newark, has approved an appropriation of \$500,000 for the construction of a new vocational school for boys at Bloomfield, N. J. It will be brick and steel, with main unit 36 x 184 ft., and two wings, each 40 x 120 ft., all three stories. Machine shops, electrical shops, tool rooms, wood-working shop and other departments will be provided. Plans will be drawn at an early date and ground broken in the spring. R. Arthur Heller is president of the Board of Education of Vocational Schools, and R. O. Beebe, secretary.

The L. E. Waterman Co., 140 Thomas Street, Newark, has filed plans for a one-story shop, 50 x 100 ft.

Following the resumption of operations at the Bayway Refinery of the Standard Oil Co., 26 Broadway, New York, at Elizabeth, N. J., tentative plans are under consideration for extensions and improvements for which an appropriation of \$1,000,000, as recently voted, is available. The refinery is now giving employment to more than 500.

Fire, Dec. 25, destroyed a building containing machinery and tools used for engine repair work at the yards of the Pennsylvania Railroad Co., Waldo Avenue, Jersey City, N. J., with loss estimated at about \$15,000, for the most part in equipment.

The Asbestos Materials Co., Millington, N. J., has taken possession of the local plant of Bateman & Co., Inc., recently

acquired and heretofore devoted to the manufacture of agricultural implements. A number of extensions and improvements will be made by the new owner, including the erection of an addition to the main factory on Central Avenue. Machinery and equipment will be installed at an early date.

Catalogs Wanted

Tolnai Vilaglapja, Budapest, Hungary VII, Dohany-Utca 12, desires American manufacturers of steel mill machinery to send catalogs.

Philadelphia

PHILADELPHIA, Jan. 9.

The Cutter Electrical & Mfg. Co., Nineteenth and Hamilton streets, Philadelphia, manufacturer of electric switches, circuit breakers, etc., has awarded contract to John N. Gill & Co., 112 South Sixteenth Street, for a four-story addition, 25 x 47 ft.

The DeLong Hook & Eye Co., Twenty-first and Clearfield streets, Philadelphia, manufacturer of metal specialties, has acquired the plant and business of the E. Kramer Machine Co., Carlstadt, N. J., manufacturer of kindred products, which will be operated as a branch. The company has increased its capital to \$1,000,000 to provide for the purchase and expansion.

The Sobel Multiplying Bookkeeping Machine Co., 880 North Forty-eighth Street, Philadelphia, will install a number of new tools at its plant, including shaper, lathe, surface grinder, power hack saw, etc.

The office of the constructing quartermaster, Frankford Arsenal, Philadelphia, will receive bids until Feb. 8 for the erection of a power plant at the Arsenal, including the installation of equipment.

Motors and other electrical and mechanical equipment will be installed in the new three-story printing plant to be erected by the Public Ledger Co., Independence Square, Philadelphia, at Seventh and Sansom streets, 150 x 200 ft. E. C. Roberts & Co., Real Estate Trust Building, are architects and engineers.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has acquired property at Main Street and Green Lane, Manayunk 142 x 169 ft., for about \$10,000, and will use the site for a new distributing plant. Plans will be prepared at an early date.

Foundation is under way for a new 30-room high school at Albany and Atlantic avenues, Atlantic City, N. J., to include a vocational department. It will cost close to \$1,000,000. The Board of Education, South Ohio Avenue, is in charge. Harry V. Young is secretary.

The board of directors, Danville State Hospital, Danville, Pa., William F. Shay, Watsonstown, Pa., president, is completing plans for a one-story power house, 50 x 250 ft., with cooling plant of 3500 tons capacity. F. Arthur Blinhard, Masonic Temple Building, Williamsport, Pa., is architect.

Fire, Jan. 2, destroyed a portion of the plant of the Boll Brothers Mfg. Co., Fourteenth and Howard streets, Harrisburg, Pa., manufacturer of brass and other metal beds and springs, with loss estimated at about \$30,000, mostly to machinery and tools. Property of the Capital City Bedding Co., occupying space in the building, sustained a loss of \$25,000. The adjoining property of the Oliver Chilled Plow Works, also, was damaged, with loss reported at \$20,000.

A vocational department will be installed in the three-story high school to be erected by the Haverford Township School District, 6635 Lansdowne Avenue, Oakmont, Pa., estimated to cost about \$200,000. Bids will be asked early in February. Boyd, Abel & Guger, 112 South Sixteenth Street, Philadelphia, are architects.

Electric generating machinery, motors, paper-mill machinery and other equipment will be installed by the P. H. Glatfelter Co., Spring Grove, Pa., operating a paper mill, in connection with additions to increase the capacity. Preliminary work has begun.

The Lower Paxton Township School Board, Lower Paxton Township, Pa., John Swartz, president, will break ground at once for a one and two-story vocational school, 85 x 90 ft., near Longstown, Pa., estimated to cost about \$55,000. Frank Sausman, Paxton, Pa., is contractor. Frank G. Fahnestock, Jr., Patriot Building, Harrisburg, Pa., is architect.

William H. Strauss, Waynesboro, Pa., and associates, have acquired the plant and property of the Cashman Tool Co., for about \$23,000. The new owners plan to organize a company and operate the works for the manufacture of metal products.

Superstructure work has commenced for the new three-story and basement junior high school, 180 x 280 ft., at

Grant and Lohigh streets, Wilkes-Barre, Pa., to include a vocational department, estimated to cost close to \$1,000,000. The Wilkes-Barre School District, 81 North Washington Street, Wilkes-Barre, is in charge. Boyd Dodson is president.

W. E. Nagle & Son, Selinsgrove, Pa., manufacturer of steel tools, etc., are arranging to triple the output at their new plant, recently occupied.

The Warren Foundry & Machine Co., 183 Sitgreaves Street, Phillipsburg, N. J., has plans under way for the erection of a new two-story building, 60 x 160 ft.

A vocational department will be installed in the three-story and basement junior high school, 250 x 260 ft., to be erected at Altoona, Pa., estimated to cost about \$300,000. Julian Millard, Hutchinson Building, is architect.

Plans have been completed for a one story power house, 50 x 50 ft., at the plant of the Phillips-Jones Corporation, Pottsville, Pa.

The York City School Board, West King Street, York, Pa., is having plans prepared for a new four-story industrial high school, 235 x 245 ft., at Beaver Street and College Avenue, and will soon call for bids. Hamme & Witman, City Bank Building, York, are architects.

The Hutchinson Mfg. Co., Inc., Norristown, Pa., manufacturer of woodworking machinery, will soon commence the erection of a new factory of structural steel, 60 x 160 ft. The company is now taking bids on materials.

F. J. Ryan & Co., Wesley Building, Philadelphia will install for the Bath Iron Works, Bath, Me., the Mires system of fuel oil burning on bar and plate furnaces, for the Prison Labor Bureau of Pennsylvania, at Huntingdon, Pa., three electric oven equipments for use in baking automobile tags and for the Philadelphia Spring Works, Philadelphia, an oil fired spring fitting furnace and an oil fired drawing furnace.

Buffalo

BUFFALO, Jan. 9

Edwin Miller, 1199 Main Street, Buffalo, has purchased the John S. Dunlop & Sons Building, St. Joseph's Avenue, and will remodel it to manufacture mining machinery.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has awarded a contract to John Schaaf, 159 Miller Avenue, Buffalo, for the erection of a new one-story building, 125 x 128 ft., on Milton Street, near the line of the New York Central Railroad Co., Buffalo, to cost about \$20,000.

A power plant will be constructed at the new plant of the National Biscuit Co., 217 Ellicott Street, Buffalo. Foundation work for which has been commenced. A machine shop and automobile service building for company trucks will also be erected. The entire works will cost approximately \$1,000,000. Headquarters of the company are at Fifth Avenue and Fifteenth Street, New York.

The Twin-Plex Reversible Window Co., Toledo, Ohio, manufacturer of galvanized steel, reversible windows and kindred specialties, is considering the erection of a new plant at Buffalo, where manufacturing operations will be concentrated. The company is controlled by Buffalo interests, including Robert E. Williams, 37 Church Street, and George H. Drake, 218 Lexington Avenue. Local sales offices are at the Builders' Exchange Building.

A one-story ice-manufacturing and cold storage plant, 38 x 75 ft., with daily capacity of about 50 tons will be constructed by the Erie Brewing Co., Erie, Pa. Plans have been completed.

The International Paper Co., Niagara Falls, N. Y., has awarded contract to the Electric Furnace Construction Co., 308 Chestnut Street, Philadelphia, for the installation of a 6000-kw. electric-steam generator. Other improvements will also be made at the mills.

A new power house will be constructed by the Board of Directors of the Crouse-Irving Hospital, 720 South Crouse Avenue, Syracuse, N. Y.

The Johnson City Motor Car Co., Johnson City, N. Y., is taking bids for a one-story automobile repair and service building, 72 x 115 ft. Charles A. Conrad, Phelps Building, Binghamton, is architect.

Fire, Dec. 21, destroyed a portion of the one-story building of the Hall Motor Co., Brayton and West Utica Streets, Buffalo, with loss, including equipment, estimated at \$50,000.

A vocational department will be installed in the new high school to be erected at Lyons, N. Y., estimated to cost about \$350,000. Plans are being completed. R. Ralph Stein is clerk.

The McDermott Steel Co., 123 Ryan Street, Buffalo, has plans under way for a new building, 200 x 250 ft., on Thompson Street, North Tonawanda, N. Y., estimated to cost about \$250,000.

New England

BOSTON, Jan. 9.

Buyers of machine tools in this section who anticipated lower prices on or about Jan. 1, are disappointed. No changes in quotations have been received and the undertone of the market, with one exception, that of planing mills, apparently is steady. A few recent inquiries for planing mills brought out concessions by both manufacturers and dealers with stock on hand. Of the general situation, a majority of local houses report a better outlook, with improvement in the character of inquiries. A large amount of prospective business probably will be closed this month, but details are lacking, chiefly because buyers are dealing with individual machine-tool houses rather than with the trade generally. The business includes miscellaneous equipment to cost about \$20,000, based on present quotations, for a company about to secure manufacturing quarters in eastern Massachusetts. It also includes a small list of tools wanted by western Massachusetts interests about to engage in manufacture. Although small this list includes two or three heavy and expensive tools.

A large percentage of prospective business concerns lathes ranging from large sizes for a nearby manufacturer to a 3-in. x 4-ft. portable machine wanted by a Portland, Me., interest. A Massachusetts maker of pumps is in the market for a four-spindle vertical boring machine. Most of the repair shops of New England railroads have reopened, having closed prior to Christmas. New England carriers are not expected to do much in the way of machine tool purchases before February or possibly March.

Sales, which dropped almost to the vanishing point the last week of the year, show considerable improvement, although the majority reported the past week were of single tools. The business closed includes a 27-in. used planer to a Lynn manufacturer, 36-in. used machine to a South Boston machinist; and a used 26-in. to a Brockton manufacturer of rubber molds. The Brockton interest had a small list out but purchased nothing but the planer. A Portland, Me., firm bought a power press, filing machine and a Greenfield grinder, while a Lynn, Mass., manufacturer took two used No. 2 Waterbury Farrel presses. A Dexter, Me., maker of brass goods closed on a Springfield pattern makers' lathe; a Worcester textile machinery maker on saw cutting equipment for making steel combs, and a Rhode Island cotton mill on a No. 2 Milwaukee B universal milling machine.

The Rhode Island textile machinery maker's inquiry for four 5-ton shop cranes has been filled, as well as the hand cranes. A Massachusetts maker of brass goods has closed on one 3-ton crane having three motors. Two small cranes for eastern Massachusetts interests show signs of developing into business. Otherwise the crane market is quiet.

A Massachusetts maker of wire products has purchased approximately \$3,000 worth of gears for replacements. The Fairbanks Co. was low bidder at \$1,625.40 on the concrete mixer wanted by the Supply Department, Boston.

Contract will shortly be awarded by the Thomas Laughlin Co., 132 Fore Street, Portland, Me., ship hardware, for a one-story, 60 x 60 ft. forgo department.

The Eastern Metal & Refining Co., 121 Beverly Street, Boston, has awarded a contract for a foundry and storage department, recently destroyed by fire.

A permit has been granted to Walter W. Field, 39 Hayward Street, Cambridge, Mass., for a machine shop to cost approximately \$8,000.

The Amigoid Co., Inc., a new organization to manufacture automobile tops, etc., has leased a group of buildings from the Rogers & Hubbard Co., Portland, Conn. O. H. Chase will be in charge of production and A. C. Rader will be associated with him.

Attachments for textile machinery will be manufactured by the Lowell Textile Associates, Inc., which will soon start operations in a portion of the plant of the Lowell Paper Tube Corporation. Thomas Bentley, Duxbury, Mass., is president; Capt. William Porter White, treasurer, and W. T. S. Bartlett, clerk.

Owing to a printer's mistake, it was erroneously stated in these columns last week that the Gilbert & Barker Mfg. Co. plans the erection of a one-story factory, 140 x 160 ft., to cost approximately \$100,000. The name of the company should have been the Seamless Rubber Co., Inc., New Haven, Conn.

The London Steam Turbine Co., Springfield, Mass., is planning the erection of a concrete and steel manufacturing building.

The Stafford Co., 1713 Hyde Park Avenue, Boston, manufacturer of textile machinery, has preliminary plans under way for a one-story foundry.

The Builders' Iron & Steel Co., Bridge Street, Cambridge, Mass., has commenced the construction of a new one-story

plant at Everett, Mass., 70 x 250 ft., estimated to cost \$65,000. Howard P. Farnier is president.

A vocational department will be installed in the three-story and basement high school addition, 207 x 257 ft., to be erected at Lawrence, Mass., at a cost of \$750,000. Work will commence at an early date. James E. Allen, Lawrence, is architect.

The Unio Specialty Co., 138 Hurd Avenue, Bridgeport, Conn., manufacturer of metal products, has awarded contract to W. M. Bennett, 121 Morehouse Street, for a two-story factory, 50 x 125 ft., estimated to cost \$50,000.

Freeman & Moody, Pawtucket, R. I., recently organized as a partnership, will operate a plant in the Chamber of Commerce Building to manufacture metal specialties. A department will be maintained for engine-turning and similar operations. G. C. Freeman and R. J. Moody are heads.

Hollander Brothers, 360 George Street, Bridgeport, Conn., manufacturer of metal products, have plans under way for a new three-story factory, 50 x 100 ft., at Stratford, Conn. A one-story power house, 20 x 35 ft., will also be erected. Davis & Dane, Bridgeport, are architects.

A. W. Flint & Co., 711 Elm Street, New Haven, Conn., manufacturer of ladders, etc., have acquired property at Hamden, near New Haven, as a site for a new one-story factory, 50 x 175 ft. It will remove its present plant on Winthrop Avenue later.

The Shawmut Machine Works, Inc., 81-83 Elmwood Street, Boston, have taken out a permit for a one-story machine shop at 84 Linden Park Street.

The American Steel & Wire Co., Worcester, Mass., has completed plans for the erection of its first new unit in connection with an expansion program, estimated to cost about \$275,000. It will be one story, 60 x 100 ft., equipped as an electric galvanizing department and will adjoin the present galvanizing works on Cemetery Street. Plans for the other additions are being drawn. Charles E. Goodrich is engineer.

The Peck, Stow, Wilcox Co., Southington, Conn., manufacturer of hardware specialties, has rejected all bids recently received for a number of additions to its plant and will call for new bids later. The work will include a two-story grinding building, 56 x 156 ft., one-story hardening department, 65 x 180 ft., and one-story forge shop, 60 x 100 ft., estimated to cost close to \$200,000, including equipment.

J. W. Dearborn, Ansonia, Conn., has purchased the automatic screw machine equipment of the Ansonia Novelty Co., Ansonia, Conn., and is equipping a factory for the manufacture of screw machine products.

Detroit

DETROIT, Jan. 9.

The Autobody Co., Lansing, Mich., which is producing thirty motor car bodies daily, plans to increase production early in the spring to 100.

Fire recently destroyed the Rogers plant of the Consumers Power Co., near Stanwood, Mich. It was one of the large units for developing power in western Michigan.

The Arnold Grinding Attachment Co., Flint, Mich., has been organized to manufacture automobile micrometer gages. It is financed by J. M. Barringer, R. T. Perry and Carl W. Bonbright. Production will start as soon as manufacturing space can be found and equipment installed.

The Citizens Light & Power Co., Adrian, Mich., plans to install a 2000-kw. turbo-generator and condenser, to be ready for service in the summer.

The Michigan Chandelier Co., Detroit, will soon start construction on a three-story addition, to cost about \$70,000.

The Petoskey Kitchen Cabinet Co., Petoskey, Mich., will soon start work on a plant to manufacture kitchen cabinets and dish washing machines. It is a new company capitalized at \$15,000 and is headed by Albert Rasmussen, Petoskey.

The Story & Clarke Piano Co., Grand Haven, Mich., is having plans prepared for a new one-story power house.

The Michigan Stamping Co., Detroit, will erect a two-story addition, 40 x 60 ft.

The General Forging Corporation, Detroit, will erect a factory building and foundry at Ecorse, Mich., in the spring.

The equipment of the Hess Marine Motor Co., Detroit, has been taken over by the Algonac Machine & Boat Works, Algonac, Mich., which will manufacture Hess motors in Algonac. The new enterprise, though owned by the Algonac Machine & Boat Works, will be operated separately.

The Chief Motors Co., Port Huron, Mich., will install several new machines to bring its production up to 100 tractors daily. It was recently amalgamated with a Cleveland motor company and a concern in Sandusky, Ohio, under the name of the Whitney Tractor Co. All products will be

shipped to Sandusky where the other parts will be made and the tractors assembled.

Several business men in Charlotte, Mich., have taken a lease on a 25-acre site with a view toward establishing a factory for the manufacture of Augustine rotary motors. They are interested in the Augustine Motors Co. and negotiations are under way to obtain the manufacturing rights and establish the main plant in Charlotte, with a capitalization of from \$1,000,000 to \$5,000,000.

The C. R. Wilson Body Co., Detroit, has purchased the Henry E. Hund Co.'s trimming and painting plant which will enable the company to furnish automobile bodies complete. Henry E. Hund will remain in charge.

Former officials of several body companies have organized the Automotive Body Corporation, to build custom bodies and special four-door sedan bodies for Ford cars. It will also do body engineering and build cabs and bodies for commercial cars. Davis Baker, formerly with the Wilson Body Co., is president; Paul Block, formerly with the Racine Mfg. Co., is vice-president; and C. M. Mulholland, secretary and treasurer. A plant will be established in Detroit.

The Sanitary Mfg. Co., of Kalamazoo, Mich., will build an addition, 112 x 400 ft. at a cost of about \$200,000. It will be completed by summer and will necessitate the addition of 125 to 150 men to the working force.

The Nickle Engineering Works, Saginaw, Mich., manufacturer of agitator equipment for chemical tanks, has leased a portion of the Schemm Brewing Co.'s plant at 920 North Hamilton Street, for machine shop purposes.

H. L. Vanderhorst, Kalamazoo, has been awarded the contract to erect the new power plant for the MacSimBar Paper Co., Otsego, Mich. The building and equipment will cost \$350,000.

The Wright Storage Battery Co., Flint, Mich., is considering plans for a two-story addition. R. R. Williams is president.

The Hanson Motor Car Co., Atlanta, Ga., is arranging for the purchase of a site at Detroit for the erection of a new plant to manufacture a six-cylinder automobile, to be marketed at about \$1,000. It is proposed to maintain the works at Atlanta, as heretofore. Arrangements will be made, also, for parts supply, to include the erection of a new plant at Detroit for this purpose, or the purchase of an existing works. The company proposes to increase its capital from \$25,000,000 to \$50,000,000. George W. Hanson is president.

The Auto Specialty Mfg. Co., St. Joseph, Mich., is having plans prepared for two one-story buildings, 80 x 325 ft., and 80 x 162 ft., estimated to cost about \$100,000, with machinery. Davidson & Weiss, 53 West Jackson Boulevard, Chicago, are architects.

The Stearns Lighting & Power Co., Shelby, Mich., will make extensions and improvements in its power plants to cost in excess of \$100,000.

The Board of Education, Saginaw, Mich., has awarded contract to the Realty Construction Co., Flint, Mich., for a new Junior high school and vocational building at Wadcock and Park avenues, estimated to cost about \$1,300,000, including equipment. Henry Witters, 406 Court Street, is president of the Board.

The Shaw Furniture Co., Ionia and McConnell streets, Grand Rapids, Mich., has awarded contract to Barnes Brothers, 402 Ionia Street, for a four-story addition, 60 x 85 ft., estimated to cost \$100,000, with equipment.

Chicago

CHICAGO, Jan. 9.

Local dealers report that inquiries are far more numerous than during the closing weeks of 1921. While much of this business has not yet progressed beyond the point of submitting quotations, a good share of it is expected to be placed. The Streets Co., Chicago, which has heretofore confined itself largely to the construction and repair of wooden freight cars, is considering adding equipment for the manufacture and repair of steel cars. It has issued a list of 36 tools, largely fabricating machines, including two axle lathes, a bending brake, bolt cutters, punches and shears, a hydraulic wheel press, a plain hydraulic forming press, and a number of electric overhead traveling cranes. Quotations on the Johns-Manville Co. list for Waukegan, Ill., have been forwarded to the New York office of the company and orders are expected to be placed in two or three weeks. The railroads have not yet taken action on their principal outstanding lists, but the Santa Fe has closed for a few machines for various points, including a 6-ft. radial drill, a heavy motor-driven floor grinder, two upright drills, and a number of small engine lathes. The Illinois Central is in the market for a driving wheel lathe and a timber sizer. The Phoenix Horse Shoe Co., Joliet, Ill., has purchased two keyseating machines, one for its Joliet plant and one for Poughkeepsie,

N. Y., in addition to the engine lathes and the shaper it purchased about two weeks ago. It is also considering the purchase of a 26-in. shaper and a boring mill.

The price situation remains substantially the same as heretofore, the only changes reported being a 10 per cent cut by the Blanchard Machine Co., Cambridge, Mass., on its line of grinding machines, and a reduction on disk grinding machines by Chas. H. Bosly & Co., Chicago.

The Ohmer Fare Register Co., Dayton, Ohio, has offered for sale about \$1,000,000 worth of surplus shop equipment, practically all of which consists of standard type machine tools.

The firm of Pollard Brothers, recently organized to manufacture manual training benches, welded steel bench legs, miscellaneous shop equipment and automotive accessories, has opened a shop and office at 4034 North Tripp Avenue, Chicago. Henry Pollard, formerly superintendent, Benjamin Electric Mfg. Co., Chicago, and A. R. Pollard formerly with the Stocker-Kumely-Wachs Co., are the partners. The former is in charge of manufacturing and designing and the latter handles sales.

Salvat & Neumeister, Inc., 5322 Harper Avenue, Chicago, has let contracts for a one-story garage, 100 x 180 ft., at the northwest corner of Cottage Grove Avenue and Fiftyeth Street, to cost \$90,000.

George Hadsall, one of the owners of the General Machine Shop, Windsor Court, Kewanee, Ill., has sold his interest in the business and in the future E. A. DeWitt and J. W. Connery will be the proprietors.

The W. K. Young Machine Co., 509 West State Street, Rockford, Ill., has been incorporated with \$25,000 capital stock to manufacture automobile parts. For some time W. K. Young, head of the company, has been working on a patent for a light weight piston for automobiles. The purpose of the piston is to prevent the oil in the engine of an automobile from overflowing into the spark plug. A patent has been secured on the piston and its manufacture will be conducted at the address given. Mr. Young was formerly connected with the Barber-Colman Co.

The Wyman-Gordon Co., manufacturer of forgings, Harvey, Ill., contemplates the construction of a power plant to cost \$100,000. Preliminary plans are now being drawn but the project is not likely to materialize until the spring of 1923.

The Osterholm Automatic Machine Co., 409 South Green Street, Chicago, has been incorporated with \$20,000 capital stock to manufacture machine tools, particularly the Osterholm automatic surface grinding machine, described in THE IRON AGE of July 28, 1921. For the present its manufacturing will be done by contract.

The Atwell Printing & Binding Co., Sherman and Polk streets, Chicago, has purchased property, 170 - 175 ft., at the southwest corner of Prairie Avenue and Twentieth Street, upon which it will construct a six-story plant to cost \$600,000.

The Paragon Foundries, Oregon, Ill., is building a large addition.

The Pollak Steel Co., South Chicago, Ill., has taken bids on a new plant to replace its present structures.

The Maxmotor Co., Muskegon, Mich., recently organized to manufacture an enclosed gas engine, has contracted with the Campbell, Wyant & Cannon Foundry Co. to make the castings for the motor. A machine shop and assembling plant are being laid out.

The Durand Steel Locker Co., Fifteenth and Arnold streets, Chicago Heights, Chicago, has awarded a contract to the Arnold Co., 105 South La Salle Street, for a one-story addition.

A vocational department will be installed in the new high school to be erected by the County School Board, Imperial, Neb., plans for which have been prepared by A. T. Simmons, Bloomington, Ill., architect. Bids will be received until Feb. 1. Alanzo Cunningham is county clerk.

The L. D. Sisson Co., 712 Builders' Exchange, Minneapolis, Minn., manufacturers of ornamental iron specialties, wire goods, etc., has awarded contract to Thor Knutsen, 101 Plymouth Building, for a new one-story and basement plant, 36 x 100 ft., on Minnehaha Avenue. L. D. Sisson is president.

The Duluth-Globe Iron Works, First Street and Hughill Avenue, Superior, Wis., has plans under way for a one-story foundry and machine shop, 140 x 150 ft., on Michigan Street, Duluth, Minn. German & Jensen, American Exchange Building, Duluth, are architects.

A vocational department will be installed in the new two-story and basement high school to be erected at International Falls, Minn., F. E. Patterson, secretary, estimated to cost about \$200,000. Tyrie & Chapman, 1200 Second Avenue, Minneapolis, Minn., are architects.

The Board of Education, St. Paul, Minn., L. R. S. Ferguson, commissioner, has awarded contract to the Gauger-

Korsmo Construction Co., 301 Endicott Building, for a new vocational school on Fourteenth Street, estimated to cost about \$600,000, including equipment. C. A. Hausler, City Hall, is architect.

The Park Tunnel Co., Aspen, Colo., will build a new tramway system to reach to the mines of the Silver Mines Co., near Aspen, for ore transportation.

The Railways Ice Co., 309 South La Salle Street, Chicago, will break ground at once for its two-story ice-manufacturing plant at Clearing, Ill., to be 150 x 300 ft., and estimated to cost about \$200,000, including machinery. E. W. Sproul, 2001 West Thirty-ninth Street, Chicago, is building contractor.

Baltimore

BALTIMORE, JAN. 9.

The Curran Motor Radiator Co., 401 Calvert Building, Baltimore, has acquired property on Hanover Street as a site for a new plant, 40 x 180 ft. The initial unit will cost about \$30,000.

The Empire State Ice Co., 76 West Monroe Street, Chicago, has perfected plans for a new factory at Cumberland, Md., two stories, 100 x 100 ft., with car dock, estimated to cost about \$200,000. Work will commence soon.

A one-story automobile service and repair building, 70 x 110 ft., to cost about \$30,000, for company trucks, will be erected by the American Sugar Refining Co., Baltimore, at its new plant. Plans have been filed.

The Common Council, Millsboro, Del., has completed plans and will commence the immediate erection of a municipal electric light and power plant.

The Standard Oil Co., First and Fourteenth streets, Baltimore, is planning for extensions and is said to have plans in preparation for the construction of five new steel storage tanks, varying from 140 to 110 ft. in diameter, and from 40 to 90 ft. high estimated to cost about \$200,000. E. A. Rudger is local manager.

A complete machine and repair shop will be installed in the new automobile service building, 100 x 150 ft., to be erected by the South Cumberland Sales & Service Station, Inc., Virginia Avenue and Fifth Street, Cumberland, Md., recently organized with a capital of \$100,000. Plans for the structure are being drawn by T. W. Biddle, Jr., Cumberland, architect. Bids for machine shop equipment will be asked late in the spring. C. L. Adams is president, and F. E. Polst, manager.

A vocational department will be installed in the two-story high school at Turboro, N. C., preliminary plans for which are under way. C. C. Hook, 207 Trust Building, Charlotte, N. C., is architect.

The Common Council, Louisville, Ga., has tentative plans for a new municipal electric light and power plant, to replace that recently destroyed by fire.

Sherwood Brothers, Inc., Garrett Building, Baltimore, has plans under way for an addition to its oil manufacturing plant in the Canton section. Property extending from Seventh to Tenth streets has been acquired and the site will be used for new buildings, as well as additional steel storage tanks. Considerable machinery will be installed. The company was recently incorporated with a capital of \$1,000,000.

The American Ice Co., Westory Building, Washington, has awarded contract to the Turner Construction Co., 1713 Sanson Street, Philadelphia, for a new two-story ice-manufacturing plant to cost \$80,000. S. A. Kimberly is local manager in charge.

The Board of Education, Richmond, Va., will break ground at once for a new four-story junior high school, 130 x 168 ft., to include a vocational department, estimated to cost about \$300,000. C. P. Walford is superintendent. Charles M. Robinson, Times-Dispatch Building, is architect.

The Oceano Brick & Tile Co., Milledgeville, Ga., has acquired the plant of the American Fireproofing Co. and contemplates enlargements. New equipment will be installed for the manufacture of brick and kindred products.

The board of directors, State Hospital, Raleigh, N. C., is having plans prepared for a new one and two-story ice and refrigerating plant. H. A. Underwood, Raleigh, is engineer. Dr. Albert Anderson is superintendent.

The New Williams Mill Co., North Wilkesboro, N. C., is making inquiries for dies and machines to manufacture wire shapes.

Fire, Dec. 30, destroyed the automobile body and wagon plant of the Hackney Brothers' Co., Wilson, N. C., with loss estimated at close to \$350,000, including equipment and stock.

The Common Council, Lansing, N. C., is planning for the

installation of a new municipal electric light and power plant E. V. Ballou is in charge.

The T. R. Watkins Co., Henderson, N. C., manufacturer of metal reels, has awarded a contract to Thomas Nelson, Henderson, for a new plant, 24 x 40 ft., with extension, 16 x 24 ft. T. R. Watkins is head.

Cincinnati

(CINCINNATI, Jan. 9.)

The first week in the new year showed a slight improvement over the closing weeks of December. The C. & O. Railroad closed on several tools inquired for some time ago and several local manufacturers received part of the order. The Louisville & Nashville Railroad has also purchased a number of tools, a local dealer receiving an order for five miscellaneous machines. Manufacturers also report scattered orders, mostly single machines. There are few new inquiries before the trade, the only one of consequence being from the National Cash Register Co., Dayton, Ohio, for a number of small tools.

The Lunken Window Co., Cherry Street, Cincinnati, has let the general contract for an addition, to be used for the manufacture of metal windows. It will be of reinforced concrete, 68 x 100 ft., two stories.

The Studebaker-Wulff Rubber Co., Columbus, Ohio, has purchased the factory of the Marion Rubber Co., Marion, Ohio, and plans to begin operations at once for the manufacture of tires.

The Banner Die, Tool & Stamping Co., 86 West Lynn Street, Columbus, Ohio, recently purchased all the equipment of the Cannon Die, Tool & Machine Co. and will operate the plant for the manufacture of dies, tools, jigs, etc., besides doing a general machine shop business. J. E. O'Brien is treasurer and general manager of the new company, which has been incorporated with a capitalization of \$20,000.

The Star Wire Hanger Co., Detroit, has purchased property in Reading, Ohio, as a site for a branch plant and has commissioned Samuel Hannaford & Sons, architects, Cincinnati, to prepare plans for a factory, two stories, 53 x 103 ft. It manufactures coat hangers and expects to begin operations with twenty-five employees.

The Gem City Machine Co., Dayton, Ohio, which recently increased its capitalization from \$25,000 to \$225,000 will be merged with the Steel Products Engineering Co., Springfield, Ohio. The Gem company specializes in the manufacture of dies and small tools, while the Steel Products company manufactures various production tools, having recently purchased the rights of the Averbek Shaper Co., Covington, Ky. J. A. McAdams, Dayton, Ohio, is president of both companies.

Pittsburgh

(PITTSBURGH, Jan. 9.)

Dullness of the closing week of 1921 in the machinery market has not been appreciably relieved the first week of the new year. One dealer reports the sale of a United States 3-hp. floor grinder. Manning, Maxwell & Moore, Inc., has been awarded a 18-in. Putnam carwheel borer by the Pittsburgh & West Virginia Railroad, and also has secured from the Westinghouse Machine Co. the order for a 4000-lb. Chambersburg steam drop hammer, and a railroad equipment company has placed three Knowles broaching machines. Bids have gone out against a number of other projects, and now that inventories are nearing completion there are strong hopes of awards before the end of the month. Prices are favorable to buyers, as competition for business still is sharp.

The Standard Underground Cable Co. has placed the order for two cranes for its new St. Louis plant with the Euclid Crane & Hoist Co., Euclid, Ohio, and this company is expected to be awarded the two cranes to be installed at the Pittsburgh works of the cable company. As indicated in this column last week, the Elliott Co. has closed for a Niles 50-ton crane with 10-ton auxiliary. Live prospects include a 15-ton mill crane for the Christy Park works, National Tube Co., McKeesport; a 15-ton, with 5-ton auxiliary, for the Frank-Kneeland works, United Engineering & Foundry Co., Pittsburgh; 15-ton crane for the Ellwood City Forge Co., Ellwood City, Pa., and a 5-ton overhead for the Elliott Co., Jeanette, Pa.

The Bronx Equipment Co., Concord Avenue and 143d Street, New York, has broken ground for its new two-story and basement plant, 52 x 120 ft., at Thirty-second Street and Saasafra Alley, Pittsburgh, to manufacture automobile bodies. It will cost about \$185,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect.

Fire, Jan. 1, destroyed a portion of the main building at the plant of the Pittsburgh Steel Tube Co., Beaver, Pa., manu-

facturer of seamless steel tubing and conduits, with loss estimated at about \$25,000. The fire, for the most part, was confined to the machine shop and tube-drawing department.

The Bessemer Gas Engine Co., Grove City, Pa., has commenced the erection of an addition to its plant. Contract has been let to H. C. Frew, Grove City.

The Duquesne Light Co., Pittsburgh, has plans under way for the second unit at its new power plant at Colfax, Pa., to include the installation of a 60,000-kw. generator with auxiliary operating machinery. Three additional power houses will also be erected in the Pittsburgh district. Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, are engineers.

J. F. McCreary & Son, Seventeenth Street, Beaver Falls, Pa., have awarded contract to the Cook-Anderson Co., Water Street, for a two-story automobile service and repair works, 50 x 95 ft., estimated to cost \$50,000. Work will commence at once.

Vocational equipment will be installed in the addition to the Technical High School, McKeesport, Pa., estimated to cost \$300,000. Plans are being prepared by T. B. and L. Wolfe, architects, Century Building, Pittsburgh.

The Stone Cliff Collieries Co., Charleston, W. Va., recently organized with a capital of \$50,000, is planning for the installation of electrical and other machinery at its properties. C. A. Brockman is president and manager; E. H. McNell is secretary.

The Wheeling Mold Foundry Co., Peninsula Street, Wheeling, W. Va., has awarded a contract to R. R. Kitchen, National Bank of West Virginia Building, for the construction of a one-story roll shop, 60 x 287 ft., estimated to cost \$55,000.

The Mountain State Motor Car Co., Charleston, W. Va., has plans under way for the erection of a new two-story service and repair works, to total about 16,000 sq. ft.

The Diamond Ice & Coal Co., Charleston, W. Va., has plans under way for the mechanical installation at its two-story ice-manufacturing plant, 100 x 100 ft., estimated to cost \$55,000. A. C. Bishop, 427 Guardian Building, Cleveland, is architect and engineer.

Milwaukee

(MILWAUKEE, Jan. 9.)

Metal working industries are getting back into production after the usual holiday interruption. While some shops resumed active work a week ago, general operations were on a small scale. This week has as a feature the reopening of a number of large shops which have been operating on a minimum scale for some time. The present schedules are light, but the outlook is regarded favorably. The machine tool trade the past week was quiet, although some fair inquiry was received and prospects appear brighter even than in December, when an appreciable pick-up in demand developed. Machine tool production remains very light.

The H. C. Prange Co., Sheboygan, Wis., has engaged W. C. Weeks, local architect, to design a central heat and power plant, 40 x 60 ft., with a 120-ft. stack and three floors above the main unit to serve as warehouse. Two new boilers, coal and ash conveyors, automatic stokers and other equipment will be purchased. The work is estimated to cost \$75,000.

The Badger Cabinet Co., Plymouth, Wis., sustained an estimated loss of \$60,000 by fire Jan. 1 which gutted the building and destroyed most of the machinery and equipment, including power plant machinery. It is the intention to build a fireproof factory early in the spring, but details have not been fixed. George Brickbauer is president.

The Racine Tool & Machinery Co., 1439 Junction Avenue, Racine, Wis., is making repairs and buying a small list of new and used equipment for replacement made necessary by fire on Dec. 27, which caused an estimated loss of \$12,000. Operations have been interrupted for about three weeks. J. Moores Jones is general manager.

The Board of Education, Chippewa Falls, Wis., will take bids after Feb. 1, for the construction and equipment of a junior high and vocational training school, 75 x 125 ft., two stories and basement, estimated to cost \$175,000. The architect is E. J. Hancock, Eau Claire, Wis. E. J. Farrell is secretary of the board.

The Clean Easy Milker Co., Madison, Wis., has been incorporated with a capital stock of \$30,000 to manufacture automatic milking machines and other farm appliances. An assembling shop will be operated at the start. The principals are B. H. Anderson, C. Hansen and L. H. Sloan, all of Madison.

The F. Rosenberg Elevator Co., 170-174 Reed Street, Milwaukee, expects to take occupancy of its new plant on a three and one-half acre site at Richard Street and the Chicago, Milwaukee & St. Paul Railroad tracks, about March 1,

and is closing on additional equipment. The building is of brick and steel, affording 35,000 sq. ft., designed for the manufacture of electric and hydraulic freight and passenger elevators, hoists, etc. Edwin C. Rosenberg is chief engineer.

The Nelson Machinery Exchange, Green Bay, Wis., has filed articles of incorporation with a capital stock of \$100,000. It was established four years ago. It is completing an addition to its shop and warehouse, display rooms and office, and is doubling the construction and repair department. The principals are H. J., D. J., Herman and Charles Nelson.

The Sterling Metal Products Co., Racine, Wis., incorporated recently by William Perry and H. F. Teshnow to manufacture mechanical appliances, automobile accessories, etc., has acquired the property of the Splitex Radiator & Mfg. Co., Racine, which recently made an assignment. The Sterling company takes over the Splitex plant and will undertake the manufacture of automobile, truck and tractor radiators, in addition to its accessory lines.

The Raymond Mfg. Co., Milwaukee, has been organized with \$30,000 capital stock to manufacture machinery, mechanical appliances and metal products, especially automotive equipment. The principals, Charles S. Raymond and Frank L. Martinek, are represented by William M. Schmahl, attorney, 76-78 Cawker Building, Milwaukee.

The Northern Refrigerator Car Co., Milwaukee, has been incorporated with a capital stock of \$425,000 to manufacture refrigerator cars and other rolling stock. The incorporators are Michael F. Cudahy, C. P. J. Kroeck and Charles O'Hare, attorney. The principals are the executive officers of Cudahy Brothers Co., meat packer, Cudahy, where a car service and repair shop will be established at once and later developed into a car construction shop.

The Cramer Mfg. Co., 387-389 Tenth Street, Milwaukee, manufacturer of pumps and other automotive equipment, has increased its capital stock from \$25,000 to \$50,000 preparatory to enlarging its plant and business. Robert Cramer is vice-president and manager.

The Milwaukee Radiator Mfg. Co., Milwaukee, has been formed with \$50,000 capital stock by local interests represented by Reginald I. Kenney, attorney, 840 Wells Building. It is understood the company will take over the plant of an existing concern, but definite details are withheld for the present.

The Board of Education, Sheboygan, Wis., has let the general contract to the L. M. Hansen Co., 113 West Walnut Street, Green Bay, Wis., for the construction of the initial unit of a proposed new \$1,250,000 high school and vocational training institute, designed by Childs & Smith, architects, 64 East Van Buren Street, Chicago.

Cleveland

CLEVELAND, JAN. 9.

The machinery market has shown some improvement since the first of the year, both orders and inquiries being more numerous and there is a somewhat better sentiment in the trade. However, buying is still confined almost wholly to single machines with the business coming from small shops. The brass industry continues to be a source of a few orders for screw machines. Some managers are lining up equipment that they figure on buying as soon as operating conditions in their plants warrant. It is reported that several machines will be purchased shortly for a school in Ada, Ohio. With this exception no new prospects developed the past week involving more than one or two machines.

The Canton Forge & Axle Co., Canton, Ohio, has been organized to operate the former Canton drop forge plant of the Standard Parts Co. which was recently sold to men associated with the new company. The officers are F. C. Moore, president; H. C. Holloway, secretary, and Thomas F. Dul'uy, general manager. It will do general commercial drop forge work.

The Adkins Mfg. Co., Canton, Ohio, has been organized and has taken over the assets of the Adkins Sales & Mfg. Co. to manufacture a high pressure lubricating system. R. G. Witters is president; L. J. Noaker, vice-president; N. J. Cummings, treasurer, and W. F. Johnston, secretary.

The Burch Power Works, Crestline, Ohio, has taken over the International Mfg. Co., of that city; maker of grain, seed and bean cleaners.

The sale of the plant of A. J. Miller & Co., Bellefontaine, Ohio, hearse manufacturer, to a newly organized company, the A. J. Miller Co., has been authorized by an order of court. Albert Riggs, receiver, will become president of the new company which will manufacture funeral cars.

The W. R. Roberts Machine Co., Lima, Ohio, has been incorporated with a capital stock of \$40,000 by W. R. Roberts and others and will operate a plant at 2223 South Main Street.

The Safety Switch Distributing Co., Canton, Ohio, has

been incorporated by John I. Bahl and others to manufacture a railroad safety switch.

The Lewis Electric Mfg. Co., Minerva, Ohio, is having plans prepared for a two-story factory, 60 x 400 ft.

Seattle

SEATTLE, Jan. 2.

The Northwestern Electric Co., Seattle, Wash., is planning the immediate rebuilding of its power house at Conas, Wash., recently destroyed by fire with loss of about \$75,000. S. E. Carlton is manager.

The Menasha Woodenware Co., North Bend, Ore., has preliminary plans under way for the erection of a new one-story plant.

The Three Lakes Lumber Co., Three Lakes, Wash., has preliminary plans under way for rebuilding the portion of its mill recently destroyed by fire, with loss estimated at \$75,000, including equipment.

The Goodyear Rubber Co., Seattle, Wash., has arranged for a lease of the two-story factory, 50 x 110 ft., to be constructed by the Great Northern Construction Co., New York Building, at Harrison Street and Terry Avenue, for the establishment of a local plant. Ground will be broken at an early date. Beezer Brothers, Seaboard Building, are architects.

The Murtaugh Irrigation District, Murtaugh, Idaho, has made application for permission to utilize waters of the Snake River for the construction of a new hydroelectric generating plant and electrically-operated pumping plant for irrigation service, estimated to cost close to \$500,000.

A vocational department will be installed in the new high school to be erected by the Board of Education, Rochester, Wash.

The Central South

ST. LOUIS, Jan. 9.

The American Foundry & Mfg. Co., 2027 Brooklyn Avenue, Kansas City, Mo., has awarded a contract to William R. Jewell, Jr., 227 Rialto Building, for the first unit of its new plant, to be one-story, 90 x 135 ft., and estimated to cost about \$35,000. Two additional units, approximately the same size, are being considered, to cost about \$65,000. Henry H. Akers is head.

A vocational department will be installed in the new high school to be erected by the Consolidated School District No. 1, King City, Mo. Work will commence at an early date. William F. Schrage, 809 Huntington Road, Kansas City, Mo., is architect.

The Common Council, Woodward, Okla., has commissioned Black & Veatch, architects, Mutual Building, Kansas City, Mo., to prepare plans for its municipal electric light and power plant, estimated to cost about \$100,000. R. O. Renfrew is mayor.

The Stafford Motor Works, Twenty-second and Campbell streets, Kansas City, Mo., has completed plans for a one and two-story machine shop at Twenty-seventh and Holmes streets, 65 x 130 ft., estimated to cost about \$27,000.

A vocational department will be installed in the new high school to be erected at Goodman, Kan., by the Shawnee Mission Rural High School District, Meriam, Kan., A. M. Meyers, chairman, estimated to cost about \$150,000. Keene & Simpson, 400 Reliance Building, Kansas City, Mo., are architects.

Fire, Dec. 30, destroyed the machine shop and other portions of the plant of the Clarksdale Machinery Co., Clarksdale, Miss., with losses estimated at about \$25,000.

The Hydro-United Tire Co., Pottstown, Pa., manufacturer of automobile tires and tubes, has acquired a controlling interest in the A. J. Stephens Rubber Co., Kansas City, Mo., manufacturer of kindred products. Tentative plans are being considered for enlargements. J. H. Phillips is president of the Hydro-United company.

An ice and refrigerating plant with initial capacity of about 75 tons a day will be constructed by the LaFollette Cream & Produce Co., LaFollette, Tenn., recently organized. Plans are being prepared. W. S. and D. A. Harkness, Jellicoe, Tenn., head the company. W. A. Yeager is local manager.

The Pine Bluff Spoke Co., Pine Bluff, Ark., has plans under way for the immediate rebuilding of the portion of its plant recently destroyed by fire with loss of about \$50,000.

A vocational department will be installed in the two-story and basement high school to be erected by the Board of Education, Haviland, Kan., estimated to cost about \$90,000. Mann & Gerow, Hutchinson, Kan., are architects.

The Standard Sanitary Mfg. Co., Bessemer Building, Pitts-

burgh, has awarded contract to the George Rommel Co., 956 Logan Street, Louisville, for a one-story addition to its Louisville plant, 56 x 175 ft., estimated to cost about \$75,000.

The Southern Refrigeration Co., Johnson City, Tenn., has preliminary plans under way for a new ice and cold storage plant.

A bond issue of \$150,000 for the construction of a municipal electric light and power plant has been approved at a special election at Altus, Okla. The Common Council is in charge. Plans will be prepared at an early date.

Henry Madler and M. J. Towle, Louisville, are having plans prepared by D. X. Murphy & Brother, architects, Louisville Trust Building, for a four-story and basement automobile service and repair works, estimated to cost about \$250,000.

The LaFollette Coal & Iron Co., LaFollette, Tenn., is planning for the construction of a new coal carbonizing plant, estimated to cost in excess of \$50,000, including equipment. Parker & Wilder, Cincinnati, are engineers.

A vocational department will be installed in the new two- and three-story high school to be erected by the Board of Education, Shaw, Miss., 150 x 225 ft., estimated to cost about \$250,000. M. W. Overstreet, Jackson, Miss., is architect.

Indiana

INDIANAPOLIS, Jan. 9.

The Interstate Car Co., Massachusetts Avenue and Sherman Drive, Indianapolis, is planning for the erection of a one-story foundry for the production of iron castings, estimated to cost about \$25,000.

The Bloomington Brick & Tile Co., Bloomington, Ind., is considering the erection of a new plant estimated to cost about \$200,000, including machinery.

The Commonwealth Edison Co., 27 West Adams Street, Chicago, has preliminary plans under way for its new electric power plant in the vicinity of Hammond, Ind., estimated to cost in excess of \$15,000,000, including machinery and transmission system.

The Citizens' Gas Co., South Pennsylvania Street, Indianapolis, is planning the erection of a new coke screening plant at its works on Prospect Street, estimated to cost about \$40,000, including equipment.

The F. W. Cook Brewing Co., Evansville, Ind., has completed plans for remodeling a portion of its plant for manufacturing ice. Machinery and equipment will be installed to provide an initial capacity of about 300 tons per day. The work is estimated to cost about \$300,000.

A one-story power plant will be erected in connection with the addition to be constructed at the plant of the Showers Brothers Co., Bloomington, Ind., manufacturer of furniture, estimated to cost about \$1,000,000. The H. K. Ferguson Co., Vickers Building, Cleveland, is architect and engineer. Charles A. Sears is superintendent.

The mill and engine room at the plant of the National Handle Co., Frankfort, Ind., were destroyed by fire Jan. 2 with an estimated loss of \$30,000. The company is a subsidiary of the American Fork & Hoe Co.

The South Bend Brewing Association, South Bend, Ind., announces that it will convert its plant for the manufacture of ice, at an estimated cost of \$75,000.

The Gulf States

BIRMINGHAM, Jan. 9.

The Missouri, Kansas & Texas Railway Co., St. Louis, is planning for extensions and improvements at Denison, Tex., to cost in excess of \$2,000,000. The work will include a new engine house, machine and repair shops, power plant and other structures.

Fire, Dec. 31, destroyed the sugar refinery of the Ingleside Sugar Refining Co., Lakeland, near Baton Rouge, La., with loss estimated at about \$200,000, including machinery.

The White Star Cement & Coal Co., Birmingham, recently organized with a capital of \$3,000,000, is planning for new cement works in the vicinity of Village Springs, Ala., with annual capacity of close to 1,000,000 bbl. Richard K. Meade & Co., 11 East Fayette Street, Baltimore, are engineers.

The Public Service Co., San Antonio, Tex., operating local electric light, power, and railroad utilities, is planning for extensions and improvements in its power plants and system during 1922 to cost about \$1,500,000. Plans for certain parts of the work are being prepared. E. H. Kifer is vice-president and general manager. The company has arranged for a bond issue of \$3,800,000.

The Thomas Gravel Co., Alexandria, La., recently organized with a capital of \$500,000, is planning for the establish-

ment of a gravel washing and screening plant on property recently leased in this section. I. L. Thomas is president and general manager.

The City Council, Bastrop, La., is planning for extensions and improvements in its municipal electric light and power plant, including the installation of new equipment, estimated to cost about \$450,000. Plans will be prepared and work placed under way at an early date.

The Louisiana Celotex Co., New Orleans, manufacturer of building board and kindred products, is planning for enlargements to double, approximately, the present capacity. A bond issue of \$500,000 has been arranged for new buildings and equipment.

The Humphreys Pure Oil Refineries Corporation, Mexia, Tex., recently organized with a capital of \$50,000,000, has selected Port Neches, Tex., as the terminus of its proposed pipe line from the Mexia fields, and plans the establishment of a refinery at this location. Col. E. A. Humphreys is head.

The Medina Valley Irrigation Co., San Antonio, Tex., is planning for the construction of a hydroelectric generating plant on the Guadalupe River, estimated to cost in excess of \$5,000,000 complete.

The Arkansas Compress Co., Corpus Christi, Tex., is arranging for extensions and improvements in its plant to cost about \$60,000. J. K. Cain is secretary and treasurer.

A vocational department will be installed in the new two-story high school to be erected by the Board of Education, Bryan, Tex. Plans have been prepared.

The Florida Nu-Tex Brick Co., 109 Water Street, Tampa, Fla., W. B. Coarsey, president, is planning for the erection of branch factories in different parts of the State to manufacture cement brick and affiliated products.

A vocational department will be installed in the two-story and basement high school to be erected by the Board of Education, Texline, Tex., estimated to cost about \$110,000. Eads & McClure, Chickasha, Okla., are architects.

H. K. Johnson, Hibernia Bank Building, New Orleans, is planning for the construction of a new electric light and power plant for service in certain sections of the city.

California

SAN FRANCISCO, Jan. 2.

The Automatic Electrical Machine Co., Oakland, Cal., has awarded contract to S. I. Lundberg, 3434 Elmwood Street, for a new one-story plant on High Street.

The Bethlehem Shipbuilding Co., San Francisco, has acquired the plant of the Southwestern Shipbuilding Co., Los Angeles, for a branch yard. Plans are under way for a new drydock capable of handling vessels of 12,000-ton rating. A portion of the property will be used as a steel fabricating plant. Francis E. Smith, at one time connected with the Government drydock at Honolulu, will be in charge.

Harry W. Fawke, San Francisco, for the past 12 years superintendent of hull construction at the plant of the Moore Shipbuilding Co., and Edward McKarley, Stockton, Cal., have organized the Terminal Iron Works Co. and have acquired the plant and property of the Stockton Iron Works, Stockton, to manufacture steel and iron products. Preliminary plans are being considered for a branch plant for ship repair work, to be operated in conjunction with the structural department.

The California Gypsum Co., Los Angeles, has applied for a lease of property at National City, Cal., as a site for a new plant, estimated to cost \$250,000, including machinery.

The Pacific Sanitary Mfg. Co., Fifth and Hensley streets, Richmond, Cal., manufacturer of sanitary ware, will commence the immediate erection of an addition, estimated to cost about \$60,000.

The Red Seal Refining Co., 243 East Ocean Boulevard, Long Beach, Cal., recently organized with a capital of \$1,500,000, is planning the erection of a new oil refinery in the West Anaheim Boulevard industrial district, estimated to cost about \$600,000, including machinery. Charles H. Gifford is president.

The Los Angeles Automotive Co., Los Angeles, has had plans prepared by the Moran Co., 511 Central Building, for a one-story plant, 70 x 250 ft., at 1020 Towne Avenue, to manufacture automobile specialties and parts. Bids have been asked and work will begin at an early date.

A vocational department will be installed in the new high school to be erected at Tustin, Cal., estimated to cost about \$250,000. Mott M. Marston, I. W. Hellman Building, Los Angeles, is architect.

The Union Ice Co., Napa, Cal., has plans nearing completion for the erection of the first unit of a new ice manufacturing plant, estimated to cost approximately \$50,000. Additional units will be erected soon, increasing the output to about 80 tons per day.

Canada

TORONTO, Jan. 9.

The demand for machine tools is still limited. Inquiries are coming forward more freely and sales of one or two tools are being made, but on the whole the market is comparatively quiet. Industrial interests in Great Britain and the United States continue to make known their intentions of establishing plants in Canada, and while several have already started, others have building programs under way which are expected to mature in the early future. The Canadian railroads have made no announcements of their intention to buy new rolling stock, but are having their equipment put in good order and many hundreds of cars have been turned in for rebuilding and repairs. This repair work has stimulated business among car shops, and although there has only been limited buying of equipment from this source for several months, dealers are of the opinion that the railroads and other car building concerns will shortly be in the market for new tools and general equipment.

Plans are being prepared for an addition to the plant of the Welland Machine & Foundry Co., Welland, Ont.

The Beeby Range Co., Ltd., recently incorporated with a capital stock of \$50,000, has leased a portion of the plant of the Machinery & Foundries, Ltd., Brockville, Ont., to manufacture cooking appliances. The directors include A. A. Dion, general manager Ottawa Gas Co., Ottawa; Joseph E. Grovelle, president Fortin & Grovelle, Ottawa; A. A. Major, vice-president S. J. Major Co., Ottawa; John H. Beeby, stove manufacturer and efficiency engineer, Ottawa, Ont.

The Oak Tire & Rubber Co., Toronto, Ont., will build an addition, construction to start in the near future.

The factory owned by the McCarter Shingle Co., Rock Bay Avenue, Victoria, B. C., was damaged by fire with loss to building and machinery of \$60,000.

The Moncton Tramway Gas & Electric Co., Moncton, N. B., has awarded the general contract for a power plant to cost \$35,000.

L. Patterson, 770 Third Avenue East, Owen Sound, Ont., is interested in a company which proposes to erect a cement-making plant there with a daily capacity of 4000 bbl.

Leslie & Harding, Georgetown, Ont., are in the market for machinery for making skates.

The Woodstock Powdered Milk Co., Woodstock, Ont., is asking for machinery and equipment to manufacture milk powder, including evaporators, separators, etc.

Short Trade Items

The Eastern Fuel Co., Frick Building, Pittsburgh, has taken over the exclusive sales agency of the Robinson Coal Co., New Superior Coal & Coke Co., Lambert Run Coal Co., Delmar Coal Co., Hughes Coal Co., East Side Utility Co., Fairmont Fuel Co., all in the Fairmont, W. Va., field and which have a combined shipping capacity of 150 cars daily.

On Jan. 1, the name of the Reading Machinery Exchange was changed to Reading Machine & Tool Co., 437 Washington Street, Reading, Pa. Some time ago the company discontinued handling used machinery, and since then has been devoting all efforts to the sale of new metal and wood-working machinery and tools, electric motors and industrial furnaces.

Joseph N. Bethel, sales engineer; Sidney Player, production manager; Richard S. Staples, metallurgist; Herbert S. Indge, engineer; and Alfred E. Box, factory superintendent, Taft-Pierce Mfg. Co., Woonsocket, R. I., have resigned, having acquired a financial interest in the Warren F. Fraser Co., Westboro, Mass., grinding machinery, which has been reorganized. Mr. Bethel is vice-president and sales manager of the reorganized concern; Mr. Player, vice-president and general manager; Mr. Staples, assistant treasurer and metallurgist; Mr. Indge, consulting engineer; and Mr. Box, plant superintendent. Other officers of the Fraser Co. include Frank A. McClaskey, Boston, vice-president; and Maurice J. Cashman, Boston, treasurer.

The Hendee Mfg. Co., Springfield, Mass., motorcycles, has sold to a syndicate of New York and Philadelphia its interest in the Harley Co., Springfield, foundry and drop forgings, on a basis of part cash and part mortgage, the total sale amounting to \$25,000. In addition to a foundry, the property consists of several one-story modern drop forging plants, a full line of equipment and miscellaneous stock on hand. The plant has been closed many months. Negotiations for its purchase have been carried on with various parties in the meantime. While the identity of the new owners is not disclosed, it is understood they are indirectly interested in the Pennsylvania Railroad, and that a special line of railroad accessories used by the Pennsylvania lines will be manufactured. Heretofore officers of the Hendee Mfg. Co. owned a substantial stock interest in the Harley Co., but recently purchased the minority holdings to protect their investment.

IRON AND INDUSTRIAL STOCKS

Little Has Developed Since Last Reports to Encourage Investment Buying

In the Middle West the purchasing power of the farmer has not increased, and the banking situation is not as clear as it might be. Money rates naturally rule higher, and unemployment is increasing. No better illustration of general industrial conditions in the East can be had than the fact that call money went begging the past week in New York at 3½ per cent. It is still difficult to secure credit in the South except at high interest rates, especially in the cotton states. With such conflicting conditions existing, the recent setback in iron and industrial stocks is understandable. Steel stocks have held relatively better than most industrials on buying fostered by merger reports. Little enthusiasm in steel shares is disclosed in investment circles, however, because of the uncertainty of forthcoming earnings reports. Further reductions in prices by automobile builders lessen the chances of dividends being earned unless consumption materially increases. The railroads are not coming forward with equipment purchases as readily as anticipated because earnings are not showing up as well as expected following drastic curtailment in operating expenses. Oil shares presumably are passing through a stage of liquidation due to falling prices for the crude fuel. The consumption of copper is on the increase, but has not reached proportions to attract heavy investment in copper securities.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal., com.	37½ - 39½	Lackawanna St.	44½ - 47½
Allis-Chal., pf.	86½ - 87	Midvale Steel...	27½ - 30½
Am. Can. com.	32½ - 34½	Nat. E. & St. c.	33½ - 36½
Am. Can. pf.	93½ - 94½	Nat. E. & St. pf.	91
Am. C. & P. com	142 - 146	N. Y. Air Brake	58 - 62½
Am. C. & P. pf.	115½ - 116	Nova Scotia Steel	22½ - 23
Am. Loco. com.	102 - 108½	Pressed St., com.	63½ - 65½
Am. Loco. pf.	113	Pressed St., pf.	91½ - 92½
Am. Rad., com.	85 - 86	Ry. St. Sp. com.	94½ - 99½
Am. St. Ed. com.	31½ - 33	Republic Steel...	27½ - 27½
Am. St. Ed. pf.	95 - 96½	Republic, com.	50½ - 54½
Bald. Loco. com.	93½ - 98½	Republic, pf.	85 - 86
Bald. Loco. pf.	104	Sloss, com.	36 - 38½
Beth. Steel, com.	52 - 52½	Sloss, pf.	69½ - 72
Beth. St., C. I. B.	55½ - 57½	Superior Steel...	26 - 27½
Beth. St., 8% pf.	104 - 104½	Transac-Wma.	25 - 33
Colo. Fuel	24½ - 26	Un. Alloy Steel.	25 - 25½
Cruicible St., com.	63½ - 67½	U. S. Pipe, com.	17
Cruicible St., pf.	82 - 85½	U. S. Steel, com.	82 - 84½
Gen. Electric	137 - 140½	U. S. Steel, pf.	114½ - 115
Gr. No. Ore Cert.	31½ - 31½	Vanadium Steel...	30½ - 32½
Gulf States Steel	45 - 47½	Va. I. C. & Cpke	85 - 87
Int. Har., com.	79½ - 82	Westinghouse El.	49½ - 50½
Int. Har., pf.	105½ - 106		

Industrial Finances

Directors of the Truscon Steel Co., Youngstown, Ohio, have declared the regular quarterly dividend of \$1.75 on preferred stock, payable Jan. 16 to holders of record Jan. 5.

The Ohio Iron & Steel Co., Youngstown, Ohio, has authorized a yearly dividend of 6 per cent in 1922 on its outstanding capital. The company is no longer engaged in steel production, but is a holding company only.

P. Leroy Harwood, New London, Conn., has been appointed trustee of the Groton Iron Works, Norwich, Conn., by Referee in Bankruptcy Thomas M. Shields.

A creditors' committee recently appointed to operate the plant of the American Motors Corporation, Plainfield, N. J., is negotiating for the sale of the property as a going business. It is said that arrangements will be consummated and production resumed at an early date. The committee is headed by R. H. Ismon of the American Motor Body Co., 30 Church Street, New York.

Directors of the Falcon Steel Co., Niles, Ohio, have authorized the regular dividend of \$1.75 on the preferred stock, and a dividend of \$1 per share on common, both payable Jan. 2 to holders of record Dec. 20. The company instituted its common stock payment on Oct. 1 last.

At a special meeting Dec. 16, stockholders of the Bessemer Limestone & Cement Co., Youngstown, Ohio approved recommendation of directors for an issue of \$750,000 8 per cent sinking fund convertible gold notes. Shareholders will have until Dec. 26 to exercise their subscription rights. Proceeds of the notes, issued under date of Jan. 1, will be employed to defray new construction expenses and to provide some additional working capital. Accumulating against Spring buying, the company is operating its cement plant at Bessemer, Pa., well toward normal. It has capacity for storing 500,000 bbl. of semi-finished material.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Bands, base price	3.13c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base	2.63c.
Channels, angles and tees under 3 in. x ¼ in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.50c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.70c.
Toe calk, ½ x ¾ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex.	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3.90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel

	Black	Galv.		Black	Galv.
½ in. Butt...	—56	—40	¾-in. Butt...	—30	—13
¾ in. Butt...	—61	—47	1½-in. Butt...	—32	—15
1-3 in. Butt...	—63	—49	2-in. Lap...	—27	—10
3¼-6 in. Lap...	—60	—46	2½-6-in. Lap...	—30	—15
7-8 in. Lap...	—56	—34	7-12-in. Lap...	—23	—7
9-12 in. Lap...	—55	—33			

Wrought Iron

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	3.75c.
Annealed soft	3.75c.
Galvanized annealed	4.50c.
Coppered basic	4.25c.
Tinned soft Bessemer	5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17½c. to 17½c.
High brass wire	17½c. to 17½c.
Brass rod	14½c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	21½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.
Cold rolled, 14-oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14-20	Primes	Wasters
			80 lb.	\$6.05	\$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC..	\$10.00	\$8.50	IC...	6.40	6.15
IX..	11.25	10.00	IX...	7.40	7.15
IXX..	13.00	11.50	IXX...	8.40	8.15
IXXX..	14.75	13.25	IXXX...	9.40	9.15
IXXXX..	16.25	15.00	IXXXX...	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5½c. to 6½c.
Bar lead	6½c. to 7 c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	85c.

Antimony

Asiatic	6½c. to 6½c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	27c. to 29c.
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Old Metals

Prices are generally unchanged, although business is very quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	8.75
Lead, tea	2.50
Zinc	2.50

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Crucible and Electric Tool Steel

Some Aspects of Choice in Their Manufacture—Electric Furnace
a Sealed Crucible—Operating Conditions
Compared in Detail

BY W. J. AND S. STUART GREEN*

PROBABLY one of the questions most frequently propounded has been—"is electric steel really as good as crucible?" Our answer has been in some cases yes and others probably no. Electric steel, using certain materials and melting practice, may be no better than open-hearth or Bessemer steel and, on the other hand, using other materials and melting practice, it may easily be the equal of the finest steel made.

Be this as it may, the basic electric furnace has established itself as a formidable competitor of the time-honored crucible wherever tool steel is made, and it seems opportune to review in a brief some thoughts gathered in a rather long crucible, though a necessarily shorter, electric experience. This experience covers the manufacture of almost every variety of alloy tool steels by both processes, including a large tonnage of high-speed steel made in 3- and 6-ton heats in the electric furnace and, last but not least, a large tonnage of straight carbon tool steel, which for the purpose of this paper is probably the most important; for it is in the manufacture of this steel, unclouded by alloys, that a true comparison can best be made.

The motive for writing the paper is a disinterested one, for we have no furnace to sell nor have we one to recommend. The choice of a melting medium for the manufacture of tool steels is now confronting some manufacturers of this commodity and, if these notes assist in the proper selection, the purpose of this paper will be fully served. To those who already have made a selection or are not, for other reasons, confronted by such a choice but are tool steel makers, this article may be of interest merely as a presentation of conclusions drawn from an intimate contact with both furnaces in contrast to the more or less inspired claims of furnace builders.

The Crucible for Steel Castings

The subject, tool steel manufacture, probably does not rightly include steel castings. This branch has, however, some small bearing on the purpose of the paper and therefore the following brief mention is made.

It has fallen to the lot of both of the writers to have had experience with the delivery of crucible steel for castings, and the passing therefore of the crucible in this branch of the steel trade seems something of a personal loss. That it is passing there can be no longer reasonable doubt; the following figures clearly show the trend and demonstrate also that the electric furnace, while not necessarily the cause, has retarded all the high-grade tonnage so relinquished.

In the United States only 1,735 tons of crucible steel cast-

ings were made in 1920 as against 20,550 tons of crucible steel castings in 1912, a falling off of almost 92 per cent. Indeed in 1919 the situation was even worse when only 1009 tons of crucible steel castings was made, a falling off of something like 95 per cent, which of course means approximate extinction. In 1920 the electric furnace made in the United States 155,196 tons of steel castings, thereby surpassing the largest crucible tonnage ever made.

These figures are taken from the statistics of the American Iron and Steel Institute and were published by the writers in graphic form in an article appearing in *THE IRON AGE*, Oct. 27, 1921. They would seem to furnish reliable indication of the rejection in America, in no uncertain fashion, of the crucible for the manufacture of steel castings. We regret our inability to secure accurate figures covering the production of steel castings in Great Britain, but those we have seem to indicate a similar, though by no means so drastic a, condition.

It appears therefore that in the manufacture of steel castings the crucible has already very largely given way to the electric furnace, which latter has incidentally secured additional tonnage elsewhere. There can be no question in face of these figures, representing as they do so strong an adoption of the electric furnace, of the satisfactory quality of electric steel for this purpose. Indeed, the writers can see one or two possible advantages in favor of the electric steel, totally aside from the strong economic reasons, which latter undoubtedly have played so large a part in its adoption. These reasons will be more fully touched in connection with tool steel production.

The Crucible and Tool Steel

The very much weakened position of the crucible in the steel casting industry is not exactly the condition to-day existing in the tool steel branch, in which the crucible still retains much of its old time dominance, particularly in Sheffield. The reasons for this are possibly to be found in the following. The steel casting industry, by reason of smaller commercial outlay requirements, became very much more competitive than the tool steel branch, with its necessarily costly hammers, rolling mills, etc. Competition suggested cheaper steel-making methods and these were tried. The converter and the open-hearth secured a portion of the cheaper work but did not succeed to the high grade and in spite of the somewhat easier quality requirements of castings as against tool steel. The electric furnace, however, could produce cheaper steel than the crucible by virtue of its greater efficiency and its quality proved to be fully satisfactory, as has been shown before. A deluge of work was diverted to the electric furnace and

*Pittsburgh.

to-day opinion is general that its product is fully satisfactory for the most exacting casting.

While this seems to have been generally agreed upon so far as castings are concerned, a similar light of inquiry is now, for reasons not very different, being turned on tool steel production by its manufacturers. The inquiry seems to be somewhat along the following lines: "Is well made electric tool steel fully the equal of crucible tool steel, and if so, what economic advantages does the electric furnace possess?" No direct answer is attempted by the writers to this question, though their opinion will be readily gathered. Before opinions are offered, however, the following figures representing, as they do, facts, might be wholesome. They indicate a growing confidence, the world over, in electric steel. The figures represent castings and ingots combined.

Table of Electric Steel Output in Tons

Year	All Countries	United States	Great Britain
1913	182,919	30,180	.....
1916	302,430	69,412	22,354
1916	559,687	168,918	50,049
1917	846,267	304,543	122,542
1918	1,176,073	511,364	150,304

The Age of Crucible Steel

The fact that crucible steel is now within two decades of its second century of birthdays is one without precedent. Indeed there is no other type of furnace whose life is even half that of the Huntsman process. This of course, is intended to cover commercial production only and not the weak speculative production of laboratory quantities in India and elsewhere, and it also refers to the production of liquid steel. Cast steel became synonymous for crucible steel and exists as a trade term to some extent to-day though the march of progress has rendered this term now almost obsolete, Bessemer steel being every bit as much entitled to the term as is crucible. The uninformed buyer, however, still specifies "Warranted Cast Steel" and has no doubts as to what he wants and is of course supplied with crucible steel.

Such remarkable longevity of a steel-making process must have a reason or reasons to keep it in so important a position for so great a number of years. Was the reason a steel-making monopoly? Undoubtedly for more than half its existence it did enjoy such a fortunate position. This monopoly played a tremendous part in its development, an enormous advantage enjoyed by no subsequent steel-making process. Articles of commerce were made from crucible steel solely by virtue of its monopoly, such as shovels, locomotive tires, etc., but this class of trade it lost with the birth of the new and cheaper steel-making methods. Among other monopolies it, of course, had the tool steel trade, and it is only in very recent years, with the birth of the electric furnace, that this monopoly has been really questioned.

If the crucible is to-day holding a large part of the tool steel trade solely by virtue of a monopoly, it has now a very precarious hold indeed, for the last 10 years have brought forward a vigorous competitor. But it cannot be doubted that this monopoly of more than 100 years does account for a fair portion of the trade it enjoys to-day.

With the monopoly of crucible steel seriously threatened there can be no question that, did the crucible possess any commercial advantages over its new competitor, it would still continue to hold its very important position in the industry. This, however, it does not; indeed, it cannot claim equality with its competitor in the most economic steel-melting medium yet known in the utilization of fuel energy, while the crucible is probably the most wasteful. The labor cost per ton of steel is also an important commercial factor in which the crucible must give way to the electric furnace. It is not opportune in an article of this sort to exhaustively dis-

cuss this last question and it is therefore left, though its importance should not be overlooked.

Is Crucible Steel Peerless?

Is crucible steel a peerless steel? If it is, then its place in the industry is secure, its wastefulness of operation is adequately neutralized, its monopoly assured. This is unquestionably the keystone of the whole position. If crucible steel cannot be duplicated in quality by any known melting medium, its preeminence cannot be assailed, neither will its markets be without profit. The question has therefore resolved itself to one of quality. We have seen that if equality of product is shared with the electric furnace, the crucible must bow to its more efficient competitor, possessing such strong commercial advantages. The passing of the crucible, as the leader of fine steel production, is therefore a strong probability, if the electric furnace can regularly and with ease produce a steel the equal of the crucible.

The views of two practical steel makers, who have worked both furnaces, may therefore be of some interest in reviewing this important question. The determination of quality is one of many phases and the writers intend to deal only with those strictly within their experience. Lathe tests, microscopical tests and other physical tests, that are of value in defining quality will not be attempted. It has long been the writer's conviction, however, that analysis alone means little indeed as an indicator of quality. The particular phase they wish to more urgently deal with being the features of melting practice in both cases which have been found to add body or, on the contrary, weaken the steel in question. The discussion therefore will be limited to the question of melting practice in so far as it affects quality, with some survey of the abilities of each method of melting to admit such practice.

Difference in Quality Limited to Furnace Practice

Inasmuch as all ingots, whether they be crucible or electric steel, can be accorded exactly the same treatment in the working to commercial sizes, it is patent that any differences of quality can be limited to the production of liquid steel and the casting thereof. This, if admitted, simplifies very much the problem. It can be at once agreed that all electric steel, if running in competition with crucible steel, shall be accorded exactly the same care, treatment and advantages in the working down to the finished bar as is crucible steel.

A survey of the subject will show that any differences between the quality of crucible steel and electric steel must occur in the liquid steel or the casting, and not introduced thereafter. The steel maker, not the hammer man or the roller, is therefore the only operative who can in any way be held responsible for difference in the quality of the two steels, outside of those differences imposed by the nature of the furnaces themselves.

The steel maker can influence the quality of his product in two ways: First, in the selection of his melting stock, and second, in his melting and casting practice. As casting practice, both crucible and electric, is distinctly capable of duplication and is duplicated daily in many large plants, a very large percentage of crucible steel being ladle cast and a large amount of electric tool steel being cast in small ingots about 4 in. square and up, it must be apparent that any difference in quality cannot arise from this source and can therefore be well left out of these considerations.

It would seem therefore reasonably certain that any differences that might exist in the qualities of crucible and electric tool steel must be introduced in the following places only:

- I.—In the selection of melting stock.
- II.—In the melting practice employed.

III.—Inherent differences imposed by the furnace employed, crucible or electric.

Having narrowed the question to the three points enumerated above, the subject can be carefully looked into with a degree of accuracy and the deductions checked against known facts where required.

The three subjects, for more careful discussion, are not arranged with any idea of order of importance, as any one of them could be vital to the success of either process. It will be seen also that no great attempt is made to investigate "mysterious virtues," sometimes even in this day, advanced in favor of the crucible, for it seems to us that while such things might well have passed muster a century ago, it is extremely questionable to-day, for the mysterious is very frequently illusory.

I. Selection of Melting Stock

The selection of melting stock, or raw materials, is a very serious responsibility, and it is noteworthy that from the early history of the crucible its melters used great discrimination, amounting to almost a fetish in such selection. The crucible held out no glamor of chemical refining, no illusory manufacture of silk from the proverbial sow's ear, and they were therefore not distracted from the straight and narrow path. Only what is put in the "weigh-pan" will be found in the steel was the dominating thought and guided them safely in the direction of the best steel-making Swedish irons, blister bar, Swedish white irons and, of course, its own tool scrap. The fact that this industry was enjoying a most complete monopoly largely assisted in such a choice, admitting the free use of somewhat expensive materials, having no keen competition to fight, nor a possibility of being supplanted by any less costly method, since it was the only steel-making process in existence.

Raw Material Costs

The crucible therefore started out with the slogan, "it takes quality to make quality." This slogan we have suggested was possibly inspired by its complete monopoly of the entire industry, and to the fact that no "red herring" in the shape of refining possibilities had to be drawn across its track. It used the best possible materials for its first quality product (we are concerned in this paper with no other) and, to a large degree, has to-day retained with remarkable fidelity this foundation of quality. Chemical guidance at the inception of this industry was entirely non-existent and its absence created brands of steel-making irons, some attaining wonderful reputations.

Many fine old brands come to our minds of the Dannemora type and, it might be said here, that soon two distinct qualities of Swedish irons were to be bought, Lancash and Walloon. These two irons, though chemically substantially identical, varied very much in price. Looking over some old records, we find Walloon iron costing as much as 28s. per hundred weight, while Lancash was as low as 9s. 6d. per hundred weight. Cost of manufacture appears to be largely responsible for this, the Walloon process being much more expensive in so far as fuel was concerned, the fuel being, of course, charcoal. Typical of quality, brought to bear on the production of first quality crucible steel, the Walloon iron, in spite of the chemical similarity of Lancash and in the face of its very much higher price, was very freely used in the manufacture of "warranted best cast steel" by the Sheffield crucible steel makers. Swedish white carburizing irons held sway over gray irons, and so, all through the selection.

The costly nature of these melting materials is emphasized by the necessity of reducing to potsize by hammer, mill and shear, all this material, but, for the excellent reason before stated, the trade was then well able to bear this further great expenditure. The situa-

tion is now changed by the arrival of its competitor, which does not require such an expenditure, in fact prefers larger stock for its reduced surface advantage. The fine brands of steel-making irons became standards from which no departures were made; materials were blended into private mixtures and these surrounded with a certain amount of secrecy, which very probably offers full explanation for such intangible claims of "mysterious virtues." These private brands certainly did much, however, to build up individual reputations, which have been very jealously guarded, in some cases for more than a century.

It will be seen that, in so far as the selection of raw materials was concerned, the crucible used only the best obtainable without regard to price. It faithfully and consistently maintained high standards and, with a few notable exceptions, does so to-day. On such a foundation, with 180 years of connection and 120 years absolute monopoly, it is not hard to see some reason for the tenacity of its hold on the tool steel business. It is well indeed to turn on the light of inquiry and see how far these things hold to-day.

Raw Materials for the Electric Furnace

Turning to the electric furnace, it is at once apparent that exact duplication of the melting stocks of the crucible is easily possible by the simple expedient of charging exactly the same materials. It is evident therefore that the electric furnace need take no second place in the question of native purity and natural body of melting stock.

It must be admitted, however, that in the early days of the electric furnace this duplication was not attempted, it not being born with a silver spoon in its mouth as was its venerable competitor. It was not born and raised under the kindly wing of monopoly, as was its rival, neither did it hold the powerful connection such as is carried by any institution almost 200 years old. What was worse, it had from its inception doubtful claims of remarkable refining properties, making possible the manufacture of the finest tool steel from any old kind of scrap, so long as it was steel. These claims, inspired no doubt by the spur of keen competition and the apparent necessity of finding some striking advantage to recommend its adoption and the consequent scrapping of the crucible, did incalculable harm at the outset. No particular attention was deemed necessary, or given to the selection of melting stock, the idea being, charge the furnace and then turn on the refining tap. Never, indeed, could the electric furnace seriously compete with the crucible while shoddy was its charge or such an outlook held sway.

This situation, happily, has now been largely rectified; elaborate refining, clever chemical manipulations, etc., now find no place in the manufacture of first grade tool steel. "Only what is in the weigh-pan will be in the finished steel" is now as largely recognized in the new industry as it is in the crucible. Considering the furnace as but 10 years old commercially it will probably be admitted that not much time has been lost in tuning up to crucible pitch.

The writers carefully outlined three standard grades of electric tool steel qualities, both as to selection of melting stock and melting practice, in an article published in THE IRON AGE Sept. 15, 1921, of which just a brief quotation as to melting stock of first quality steel is taken:

Charge to consist of all heavy melting stock insuring little oxidation. . . . Well under manganese and phosphorus of final specification. American Swedish, rolling mill iron, ingot iron or similar stock being desirable, except as hereinafter provided. Charge shall contain not less than 10 per cent of washed metal or Swedish carbonizing iron. . . . and not less than 20 per cent but up to 40 per cent of heavy electric furnace tool scrap. . . . replacing to amount used, stock described above.

There can be no question that where such melting

stock is used the crucible has not the slightest lead, and such materials are used and have been used for some time. Fuller details as to mixture standardization and designing can be obtained from the article, as can an outline of the cheaper grades. The standard mixtures and qualities of the crucible, which have done so much to build up its reputation, are to be found in just as complete a form in the tool steel electric furnace. Continuity of product and standard quality grades are no longer the monopoly of the crucible, but are shared possibly to an equal degree by its youthful competitor.

It is agreed, therefore, that a full equality in the selection of melting stock is already shared in some quarters by the electric furnace and where not, can be, by the simple duplication of crucible charges. The exception to this is in favor of the electric furnace, which does not require its stock reduced to pot size; indeed, prefers larger material, and so secures a valuable commercial and possibly some slight metallurgical advantage.

II. Melting Practice

The whole purpose of the crucible process, in so far as melting practice is concerned, is to bring by melting fusion the whole contents of the weigh-pan into one perfect blend of finished steel. Once this fusion is complete and clearly melted, the contents of the pot are killed by what is known as a killing fire, the correct casting temperature attained; then the melting process is complete. No manipulation of slags and no refining is possible and the process is thereby saved this complication, possessed by other melting mediums.

The blend is made in the weigh-pan and substantially no other change can be made thereafter. The melter's concern is largely correct melting and killing, correct casting temperatures and, lastly, due care of his furnace and his pots. He has also the executive control of his crews and also the care of his molds and their correct setting up, but this only indirectly, as of course the molders are directly responsible. He is only rarely called upon to design mixtures though in some cases he is required to act as "weigh-up," in which case he personally weighs his own melting stock, according to mixtures supplied him.

The process is carried out in a sealed crucible with the flame not in contact with the metal of which more will be said later. The conditions in the pot are mildly oxidizing at the start, as can be gathered from the drop in carbon experienced in the Sheffield white pot, and gradually change to mildly reducing as the heat progresses. While this early, mildly oxidizing condition also occurs when using graphite pots, it is not so apparent, for in the later stages this pot throws considerable carbon which is absorbed by the steel and therefore obscures any early loss. Incidentally the amount of carbon thrown in this fashion is not always under perfect control.

Simplicity of the Crucible Process

Summarizing the foregoing, it will be seen that simplicity characterizes the melting practice of the crucible in so far as chemical reactions and manipulations are concerned, which is significantly one of the strengths of the process. It holds no rewards for ingenious operation, offers no attractive short cuts and tolerates no detours. This has safeguarded the process to quite an extent and, in these days when its monopoly has vanished, is valuable indeed in assisting it to continue to hold on the tool steel business.

The electric furnace from the first held out wonderful refining abilities; the furnace was compared with the chemist's casserole, and these were mistakenly recognized as great advantages over the crucible. Shoddy could be refined and made tool steel. This mistaken idea led to a very complete development of refining methods, slags and manipulations, but these, all

right in their place, such as in third grade quality, competing with the watered stock of the crucible third grades, will not do in the manufacture of first grade tool steel.

The electric furnace of to-day, however, recognizes this to quite a large degree and is operated in the manufacture of tool steel exactly as a large and efficient crucible. Its melting practice is most remarkably like that of the crucible. To briefly quote from our article of Sept. 15, 1921, regarding first quality electric tool steel melting practice:

"Positively no ore additions, mill scale or bolting of any kind tolerated . . . no slag shall be taken off (exposing the bare metal to oxidation). Every attempt should be made to duplicate crucible conditions . . . in melting practice."

Electric a Repetition of the Crucible

It will be seen therefore that the modern thought on electric tool steel production, in so far as melting practice is concerned, represents an almost exact repetition of crucible practice. The heat is not boiled, slags are not taken off, the quality is in the charge, which has been selected with the same care as the crucible. Chemically the conditions are also most remarkably synonymous.

The electric furnace, when following the lines outlined, is in the initial stages like the crucible, mildly oxidizing. It is oxidizing to about the same degree as the Sheffield crucible, as can be noted by the similar three to five point drop in carbon in melting down. Again, like the crucible, the conditions change to reducing; a slag is formed covering the metal and forming a liquid seal, very much as Huntsman used himself in his early manufacture of crucible steel. This seal is ably supported by tight furnace doors and the strongly reducing atmosphere of the furnace. This is the only steel-making process that does not require oxygen to burn its fuel, and it must be seen therefore that the crucible can make no claims for virtues accruing from a sealed crucible which are not fully shared by the electric furnace. The electric furnace, when run along tool steel lines, can in effect be nothing other than a large efficient, sealed crucible, and its melting practice is readily and successfully amenable to duplication, with the possible advantage in favor of the electric furnace of stronger reducing conditions. The case for equality of electric melting practice seems to be strong, representing as it does so faithful a duplication of the crucible.

III. Inherent Differences of the Two Furnaces

As to inherent differences resulting from the variation of the types of furnaces employed, crucible or electric, this has necessarily been touched in the foregoing, from which deductions might be taken. We must confess that we can see no difference except in size and efficiency.

Probably the strongest and most important claim ever made for the crucible is the fact that the steel is melted in a sealed crucible and is therefore untouched by flame. How far the electric furnaces duplicate this has already necessarily been suggested, but the following thought analyzes the position somewhat more fully. The Bessemer, open-hearth and crucible processes all require the mechanical delivery of air in large quantities to the hearth of the furnace, in order to make possible fuel consumption. In the Bessemer, the fuel being silicon, and that being found only in the very composition of the metal, it is apparent that no protection can be offered the steel against the ravages of oxidation.

The open-hearth also requires large quantities of air throughout the process to burn its fuel, oil or gas as the case may be. An attempt is made to protect the metal from this strongly oxidizing flame to some extent by carrying a slag at the later stages of the operation.

How ineffectual this is against so consistent and strong an oxidizing flame is apparent by a glance at the appalling alloy loss when present in the scrap or added in the furnace and the extremely oxidized condition of the slag. When one considers the enormous volume of air necessarily introduced into the very hearth of the furnace, the failure to provide any complete protection is not surprising.

The crucible furnace also requires a large and steady volume of air to burn its fuel, whether it be coke, gas or oil, and this has also to be introduced right in the hearth of the furnace. Its flame is an oxidizing one and would do much damage to the steel if no protection could be offered. Protection is, however, supplied to a very satisfying degree. The steel is inclosed in a crucible and the top of the steel is at the later stages covered with a flux inside the pot and the crucible mouth is closed by a lid or cap. It will be seen that the protection against flame is almost complete; is, in fact, complete were it not that several times during the melting process the lid must needs be opened and the condition of the steel investigated by the introduction of a potter and also for the purpose of adding certain alloys or medicine. The degree of oxidation resulting from this is very slight, but that it does exist can be seen from the slight loss of easily oxidized alloys experienced when such are added. It is certain, however, that its protection far exceeds that of the Bessemer or open-hearth, and this, together with its careful melting stock selection, etc., easily explains its dominating position as a tool steel producing unit heretofore.

Comparison of the Fuels

The electric furnace, which now contends for a share of the honors of the tool steel business, is very fortunately placed in this respect, for it does not require air or oxygen to burn its fuel. Its fuel possesses the striking advantage of being capable of employment in a strongly reducing atmosphere, or for that matter any atmosphere. Vast quantities of air have not to be artificially supplied to the furnace; in fact, none at all is required, therefore the protection problem is almost naturally solved. No crucible need be furnished, though as a matter of fact, a furnace having the major characteristics of a crucible is supplied, and those leaks, by virtue of taking the lid off, in this case opening the doors, and also such as occur from a furnace that is not tight, are taken care of in a very complete fashion. A strongly reducing atmosphere is maintained from very early in the operation, right away to tapping, a liquid seal of a controllable viscosity is furnished and this seal or slag is itself strongly reduced, carrying an excess of carbon available and ready for any stray oxygen that may perhaps come along. This is quite unlike the open-hearth and some idea of its effectiveness can be gathered from the almost complete recovery of a fraction of one per cent of vanadium in the scrap that has been charged. In the direct addition of alloys, excepting, of course, losses due to the volatile nature of the alloys, the loss is almost negligible, and speaking conservatively, certainly not any more than the crucible.

From the foregoing the electric furnace is indeed for all practical purposes a large sealed crucible, and where any differences are to be found, they are in the direction of even greater protection in the case of the electric furnace. It is difficult to find, therefore, any inherent differences that would to any measurable degree affect the quality of the steel, providing the electric furnace is run along the lines suggested. We have therefore but to assume that the case was covered by the two preceding points.

Conclusions

The case has been outlined and the various points dealt with as they appear to the authors. If what we have said is correct, the electric furnace bids fair to

supplant the crucible to a greater degree than heretofore, though it is possible, never completely. A strong case seems to have been made for the electric furnace, which argues the full ability of that furnace to readily and successfully duplicate in quality—"warranted best crucible steel." The case has been dealt with on the premises of three major deciding factors, the investigation of none of which seems unfavorable to the electric furnace. Though these represent the frank opinions of the writers, it is, of course, possible that their findings are not justifiable; of this, however, the reader must be the judge.

If the case is admitted, it seems certain that the electric furnace must assume the dominating position in the industry, by virtue of its powerful economic advantages, which possess so attractive a commercial value. The passing of the crucible seems analogous to the passing of the dreadnought. Whatever the future holds, however, that grand old pioneer, the crucible, has left high standards and marks on the sands of time that will not be effaced.

American Pig Iron Association Addressed by Colonel Richards

Retiring officers of the American Pig Iron Association were re-elected at the annual meeting held at the William Penn Hotel, Pittsburgh, Jan. 12. Theodore Friend, Clinton Iron & Steel Co., Pittsburgh, continues as president of the association; John A. Penton, Penton Publishing Co., Cleveland, secretary; and Col. F. B. Richards, M. A. Hanna & Co., Cleveland, treasurer.

An interesting talk on the European financial situation by Colonel Richards was a feature of the meeting. It was the speaker's idea that if the war debt of Europe to this country is ever to be paid, it would be necessary for this country to cut down the bill materially and to fund the remainder by long-time bonds. Europe insisted, the speaker said, that it spent most of the money borrowed in the United States in this country, and that, as it paid war-time prices, it was entitled to some rebate. Colonel Richards thought that by remitting or writing off a part of our claims upon European nations, which had borrowed from us, with a corresponding remission by those nations in their claims upon others, including Germany, the situation in Europe would mend more rapidly than would be possible by insistence upon full payments.

There was discussion of freight rates which resulted in a motion empowering the president to appoint a committee of one or two to go to Washington to present the claims of the association that freight charges on pig iron from all centers of production to consuming points are so high as to hamper business.

German Hardware in Damascus

WASHINGTON, Jan. 17.—Practically all the hardware and tools being sold in Damascus are of German manufacture, the low exchange value of the German mark favoring the introduction of German goods in spite of the fact that the reappraisal system now being practised by the Syrian customs authorities has the effect of increasing the duty on some kinds of German goods to as much as 50 per cent ad valorem while the legal duty is only 11 per cent ad valorem. This control by Germany of the market in Damascus is set forth in a report on "Metals and Hardware" received by the Bureau of Foreign and Domestic Commerce from Consul Charles E. Allen, dated Dec. 3, 1921.

There is a brisk demand for all kinds of small hardware, the report states, the machine-made foreign product, on account of its greater symmetry, attractiveness and, latterly, cheapness, having begun to force the ill-formed, though durable, local hand-made product out of use. The making of tools, nails and all kinds of small hardware by hand is still an important local industry, but it is daily becoming increasingly difficult to compete with the foreign industry. In fact, the report points out, it can only do so because time has not yet come to have any value in Damascus.

PATENT BILL PASSED

House Approves Measure Which Will Be Urged in the Senate

WASHINGTON, Jan. 17.—The Lampert patent bill, which has the strong support of engineering societies and industrial interests of the country, passed the House Thursday by a vote of 198 to 36, and efforts are now being made to get it through the Senate. The bill is now before the Senate Committee on Patents and it is hoped it will be put through and enacted into law at an early date.

While it was supported by a large majority in the House, the measure also was the source of considerable opposition at the hands of such members as Majority Leader Mondell and Representative Madden, chairman of the Committee on Appropriations. The general attitude of those opposing the measure was based on the ground of the necessity for so-called economy, and the contention that the legislation provided should be taken care of in the Lehlbach classification bill providing for salary adjustments throughout the Government service, but carrying less increases for Patent Office employees than allowed by the Lampert bill.

The Lampert bill provides for increases in personnel as follows: One law examiner; 26 assistant examiners and 21 clerks, aggregating 48 additional employees. Increases in salaries are made as follows: Commissioner of Patents, from \$5,000 to \$6,000; first assistant, from \$4,500 to \$5,500; second assistant, from \$3,500 to \$5,000; examiner-in-chief, from \$3,500 to \$5,000; solicitor, from \$2,750 to \$5,000; chief clerk, from \$3,000 to \$4,000; law examiner, from \$2,750 to \$4,000; principal examiners, from \$2,700 to \$3,900; first assistants, from \$2,400 to \$2,900, \$3,100 and \$3,300; and second assistants, from \$2,100 to \$2,500 and \$2,800.

In order to cover the additional cost of conducting the Patent Office by reason of increased salaries, the bill provides an increase in the fees. Practically all of

the work on a patent is done when the application is first made, and the initial fee is \$15. The secondary fee upon the granting of the patent, under the present law, is \$20. The Lampert bill raises the first fee from \$15 to \$20, and it is estimated that it will bring into the Treasury over \$500,000 annually. It is declared to be the only piece of legislation in the way of wage increase that not alone pays for itself but will bring revenue into the Treasury. It was this feature of the bill that played an important part in destroying the argument of those who opposed it on the grounds of economy. The measure also gained strength because it omitted the Federal Trade Commission rider.

The extreme importance of the legislation has been repeatedly pointed out by its proponents in industry and engineering societies and was emphasized by Representative Lampert and others. He repeated figures heretofore given regarding the large number of resignations owing to the low salary scale and showed that during the calendar year 1919 the number of patent applications filed arose to over 76,000, exceeding by 19,000 the number in 1918, while 1920 exceeded 1918 by 24,000 patent applications, and 1921 exceeded 1918 by 30,000. Increase of work was also shown in the cash receipts of the Patent Office, which in 1918 amounted to \$1,977,000; in 1919, \$2,417,000; 1920, \$2,680,000; and 1921, to \$2,775,000, an increase of \$800,000, or 40 per cent over 1918. Mr. Lampert said that the increase in work is overwhelming and that the Patent Office is hopelessly in arrears. There are now 59,000 patent applications and 6000 trade-mark cases awaiting action, and with more than one-half of the force composed of untrained men, it was declared that the Patent Office cannot escape going further in arrears.

"Even with the relief afforded by the present bill," said Mr. Lampert, "it will take several years to build up the present force, with so many inexperienced men, into a stable, competent examining corps, able to make any material impression upon the arrears of work already piled up."

AUTOMOBILE PRODUCTION IN 1921

More Than One Million Tons of Steel Used—Considerably Less Than in 1920

Estimating the average weight of iron and steel per passenger automobile at 1500 lb. and the average weight per truck at 2250 lb., the total amount of iron and steel used in automobile construction during the year was apparently about 1,175,000 gross tons. This is approximately 9 per cent of the year's output of rolled and forged steel. The figure is based on a total production amounting to 1,680,000 cars and trucks, of which 145,000 or 8.63 per cent were trucks, and the remainder passenger and other light cars, according to the National Automobile Chamber of Commerce. The total figure is a reduction of 24 per cent from the 1920 output.

Passengers to the number of 6,000,000,000 are said to be carried annually by motor cars. This compares with 1,100,000,000 carried by the railroads of the United States annually, and with 1,418,000,000 carried by the rapid transit (elevated and subway) lines of New York, in the year ending June 30, 1921. Freight annually handled by motor truck is given as 1,200,000,000 tons, which compares with 2,290,000,000 tons of freight carried by the railroads, this being the average of 1917 and 1918.

It is stated that the wholesale value of the cars and trucks produced in 1921 was \$1,222,350,000, a reduction of 45 per cent from 1920. The value of automobiles was stated at \$1,088,100,000, or \$702 per car, a reduction of 21½ per cent from the \$897 average of 1920. The wholesale value of motor trucks produced is given as \$134,250,000, an average of \$968 per truck, or a reduction of 24 per cent from the \$1,273 average of 1920. Tire casings amounting to 19,379,000 were produced, together with inner tubes to the extent of 24,157,000 and solid tires numbering 377,000.

The figures given show an approximate total of 10,000,000 automobiles registered in the United States, of which 9,000,000 are cars and 1,000,000 are trucks.

Of the total, 3,000,000 or 30 per cent are reported owned by farmers, the farmer ownership of trucks being 150,000, or 15 per cent of the total trucks, and of cars 2,850,000, or 31.7 per cent of the total cars.

Electric Melting and Heat Treating Furnaces Designed by Students

Four types of electric furnaces, designed and constructed largely by students, are being built for use of the department of chemical engineering, college of engineering, University of Wisconsin, Madison, in the course of electric furnace practice.

A special resistor electric muffle furnace which will stand a temperature up to 3600 deg. Fahr., now under construction, is unique in that it combines all of the advantages of a gas furnace with the higher temperature and temperature control possible in an electric furnace. This stove is fitted for investigation of refractory materials and heat treatment of metals over the highest temperature range. As it will operate continuously at or over 2000 deg. Fahr., with only 4 kw., at a cost of but 6c. per hr., or one-fifth as much as it costs to operate a gas furnace under similar conditions, this furnace is regarded as having exceptional economic qualities.

Another furnace under construction is an electric arc furnace. No lining is used, the shell being kept from melting or oxidizing by a constant spray of cold water from a perforated pipe which surrounds the furnace. It has a melting temperature of 4000 deg. Fahr., and will be used for smelting various ores.

An Arsem vacuum furnace has recently been rebuilt. All air is pumped out to prevent combustion by oxidation. Temperatures up to 5000 deg. Fahr. may be obtained by passing an electric current through a spiral graphite tube.

The fourth type of furnace is an electric carbon resistance type for determining the load carrying capacities of firebrick and other refractory ware.

Applications of Continuous Die Rolling*

Especially Adapted for Making Forging Blanks—
Macrographs and Micrographs Show
Smooth and Uniform Metal Flow

BY G. R. NORTON

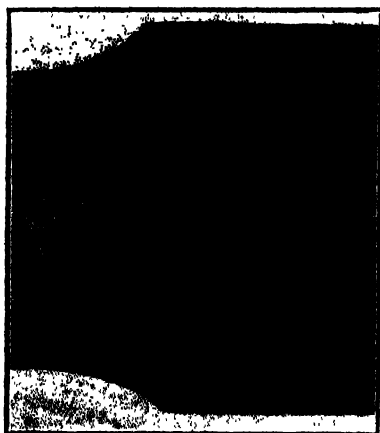
CONTINUOUS die rolling is the process of producing bars in which the form of cross-section is varied according to impressions sunk in the pair of rolls between which the final pass is made. At each revolution of the rolls the design cut in their surfaces is repeated on the bar passing between them, and the number of these repetitions is limited only by the length of the bar.

Wagon-box straps and axle-clip sections have been produced in this manner for years. In these bars, a round alternates with a half-oval or bevel-edged flat and the change in section is accomplished by passing a round bar between the rolls, allowing the bar to pass for a certain distance without change, after which it is flattened and spread for the desired length of this part. The number of round and flat sections produced at each revolution will, of course, depend on their lengths and the diameters of the rolls.

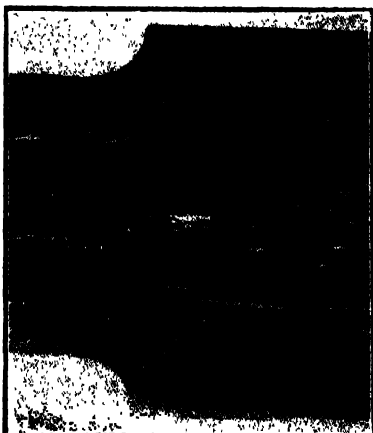
In rolling sections of this character it is not neces-

roll, and provides for easy and inexpensive dressings, repairs or changes. Wear on these rolls can be compensated for in various ways and the length of any impression held constant.

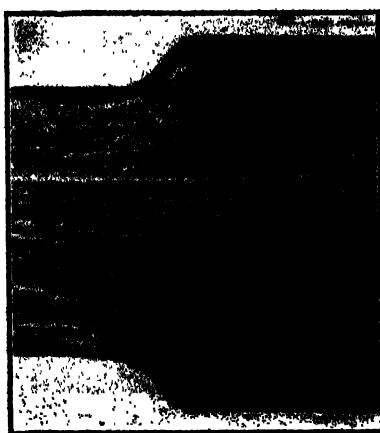
To produce sections symmetrical about their longitudinal axes, followed by other sections that may be offset, it is necessary to provide for the exact matching of the opposing rolls. This is done by mounting pinions on the rolls opposite the driven side. As only one roll is driven from the roll train and always in the same direction, these pinions are used to match the rolls exactly and are provided with adjusting devices for this purpose. Once the rolls are properly matched, there is no variation in the alinement of the impressions. It can be seen easily that, to handle this class of work economically, considerably more equipment than one finishing stand of rolls is necessary. The leader or bar, on which the forming pass is made, cannot in all cases be a predetermined shape and must



A Rolled Shaft (Two diameters)



A Forged Shaft (Two diameters)



An Upset Shaft (Two diameters)

sary that impressions be formed in both rolls, because the round has been produced by straight rolling and it is only necessary to change its shape; so one roll can have a plain surface, the impression being cut in its mate. This usually results in a slight flattening of the round, which would be objectionable if great accuracy of size were required. The bars become oversized as the rolls wear in service and, if dressing is done by turning off the surfaces of the rolls and recutting the impressions, a loss in circumferential length results which changes the lengths of the impressions.

Continuous die rolling as developed by the Witherow Steel Co. has as its basis the production of more complicated sections with greater accuracy. This is accomplished by building up the active surfaces of the rolls, instead of sinking impressions in the ordinary roll casting. Cast or forged rings, of material suitable to the character of the section to be rolled, are cut into segments, in the outer surfaces of which complete impressions or parts of impressions are sunk. The rings are assembled on mandrels to which they are locked. This segmental construction, or building up the groove, involves but little material as compared with a solid

be found by trial. Frequently leaders are made that do not conform to any standard commercial shapes and would, therefore, be difficult and costly to obtain. The heating, handling and rolling of single bars would operate against good production and increase costs. It is necessary, therefore, to work from billets that are roughed down and rolled to the desired form of leader, according to usual rolling practice, and finished in the same heat. This method has a considerable advantage metallurgically, because the billets are brought slowly from atmospheric to rolling temperature in continuous furnaces and can be timed to take the last pass at the proper finishing temperatures. The metal is worked uniformly and completely in one direction and its flow, as exhibited by studies of the macrostructure, is more uniform than in forging.

It should be understood clearly that continuous die rolling bears no relation to the forming of variable-section bars on forging or eccentric rolls, where the stock is cut to the desired weight and each piece is handled individually, a large number of passes being made and the stock rotated 90 deg. at each pass.

Generally, it is held that hammering has a refining effect on steel and is a much superior method to rolling. Charpy showed by experiment and tests that certain physical properties are varied according to the amount of work done, independently of the method. By the amount of work done is meant the reduction of area

*Paper substantially in full as presented at the annual meeting of the Society of Automotive Engineers, Jan. 10, 11, 12 and 13. The author is steel works manager of the Witherow Steel Co., Pittsburgh. An exclusive article by Mr. Norton appeared in *The Iron Age* of Jan. 6, 1921, on "Rolling of Variable Section Steel Bars."

from the original to the finished section, and the ratio of the original area to the worked area is called the coefficient of work.

To demonstrate the relative values of different processes, the amount of work done being the same, a 2-in. round billet, of 0.45 per cent carbon open-hearth steel, was rolled into a rear-axle drive-shaft having maximum diameters of 1-9/16 in. at the wheel and spline ends and a minimum diameter of 1-3/16 in. at the end of the long taper next to the spline end. From the same billet, duplicates of this shaft were forged and a bar was rolled



Continuous Die Rolling Produces a Flash



A Cross Section of a Rear-Axle Shaft Showing the Flash

1-3/16 in. in diameter on which upsets, 1-9/16 in. in diameter were made, the lengths of the upset being the same as those of the rolled and forged shafts. The reduction of area from the billet to the smallest diameter of the shaft was 64.75 per cent, or a coefficient of work of 2.84.

Charpy impact tests were taken on the axes of the shafts at the point of junction between the long taper and the spline end and an examination made of the microstructure and macrostructure. A second set of shafts duplicating the first was heated to 840 deg. cent. (1544 deg. Fahr.), held 15 min., quenched in oil and the impact tests and microscopic examinations repeated. The accompanying table shows the result of these tests and indicates that the method of working is a factor

Charpy Impact-Tests			
Tested Melted on	Energy Absorbed, Ft.-Lb.	Strength, Per Cent	Increase by Treatment, Per Cent
Rolled shaft, untreated.....	13.59	100.0	....
Forged shaft, untreated.....	6.32	46.5	....
Upset shaft, untreated.....	4.85	35.7	....
Rolled shaft, treated.....	18.06	100.0	32.9
Forged shaft, treated.....	14.08	77.8	123.0
Upset shaft, treated.....	10.83	60.0	123.2

to be considered seriously in connection with the physical properties of steel.

The accompanying macrographs and micrographs show a smoother and more uniform flow of metal in the rolled specimens than in the others and a better refinement of grain-size before treatment. This is due to the fact that continuous die rolling is a continuous process of working rather than discontinuous, as in forging, upsetting or eccentric rolling.

In continuous die rolling, it is not possible to make successive forming passes because of the difficulty in entering a partially formed bar at exactly the right point in the impressions in the rolls; so the entire

forming must be accomplished in one pass. When very great reductions of area are necessary, some flash or overfill will occur. The bar will be extruded between the rolls to a considerable extent but, at some point, depending upon the character of the section, the volume displacement cannot be carried further in the impressions and the rolls spring apart, relieving the grooves and allowing a portion of the metal to spread between the faces of the rolls. This flash can be controlled to some extent and may vary in thickness from 1/32 to 1/4 in. As the bar does not rotate in the pass, any flash produced is straight and can be removed easily by trimming.

It has been found that the sectional forms into which bars are changed materially affect the amount of flash and extrusion that takes place, and no rule has been found to govern all cases. However, because the rolling is in effect reducing or drawing with but little spreading action, the flash will always be considerably less than would be produced on the same piece under a hammer and, consequently, the wastage of stock is less.

Many forgings require preliminary operations, such as upsetting or drawing, before the stock is in such form as to be struck easily in finishing impressions without excessive waste and wear on dies. Frequently, so much work of this character is involved that two tools are necessary to complete the forging and, as the



Tie Rods After Delivery from the Continuous Die Rolls

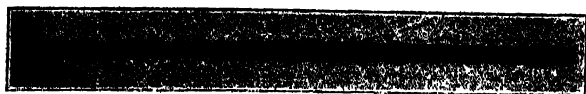
preliminary and finishing operations are not balanced exactly, and in many cases cannot be completed in one heat, time is lost and much expense is incurred. Continuous die rolling provides a means of supplying blanks for forging that can be struck directly in the finishing impressions in the dies, or struck after one or two edging blows, if offsets or bends are required to be made. A properly designed blank can be reproduced with great accuracy, eliminating the forging scrap caused by blanks made improperly under the hammer.

Front-axle I-beam blanks that can be finished under one hammer for either the Elliott or reversed-Elliott type of axle, can be rolled. Blanks for camshafts, ready to strike for finishing, can be rolled, thus eliminating the blocking or upsetting operations and the rolling-in dies immediately preceding forging. Spring-clips can be rolled with the offsets for bending exactly as forged. A small amount of flash is produced, which requires cold-trimming before the clips are bent. Rear-axle drive-shafts can be rolled and, after trimming, are ready for hardening and machining.

The product of continuous die rolling is received from the mill in the form of long bars, in lengths that are multiples of the lengths of the individual pieces. The length of these bars will depend upon the weight

of billet used. After cooling, they are cut into ordinary mill lengths or into single pieces. After this, trimming or any finishing operations can be performed.

Quantity is obviously essential to the economy of operation, because the expense of cutting rolls and setting up a mill could not well be carried by a few pieces. The cost of this type of conversion naturally must be



This Illustrates the Possibilities of Continuous Die Rolling Where Round, Square and Hexagonal Cross-Sections Alternate

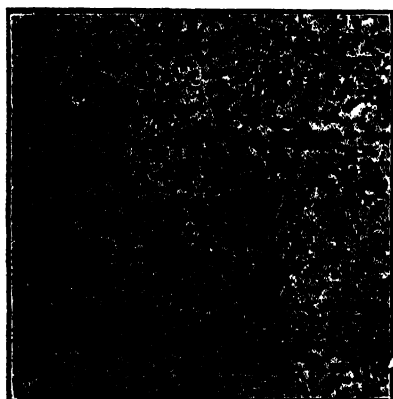
greater than ordinary conversion from billets to bars, for this work is necessary as a preliminary to the final die forming; also, to the bar-conversion cost must be added the costs of the die rolls and their maintenance, special forms of guides for delivery and adjusting gears

quantity-production requirements and the large number of forgings used.

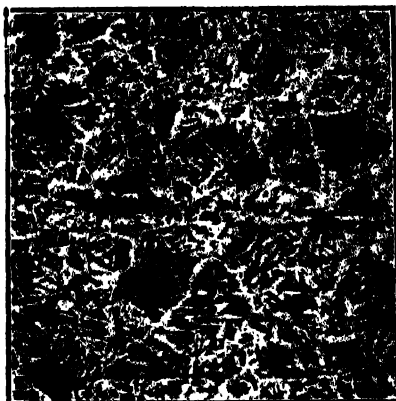
From its beginning, the practice of rolling has been improved only along the lines of increasing the tonnage capacity of mills, without much effort to depart from the manufacture of standard rolled shapes, and bars of constant area and form of section; so, the development of continuous die rolling on a commercial basis for the production of variable-section bars is something new in an industry in which few radical changes have taken place.

National Council Will Consider Railroad Situation

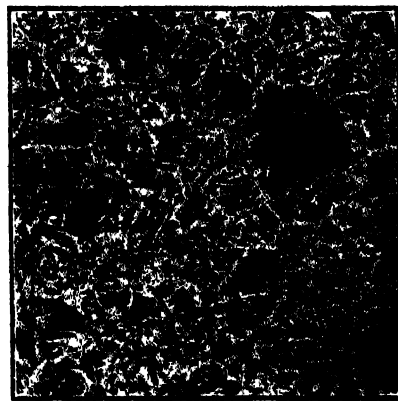
WASHINGTON, Jan. 17.—The railroad situation and what should be done about it from the business standpoint will be considered at a meeting of the National Council of the Chamber of Commerce of the United States to be held in Washington Feb. 8 and 9. The council is made up of one representative each from the



An Untreated Rolled Shaft
(100 diameters)



An Untreated Forged Shaft
(100 diameters)



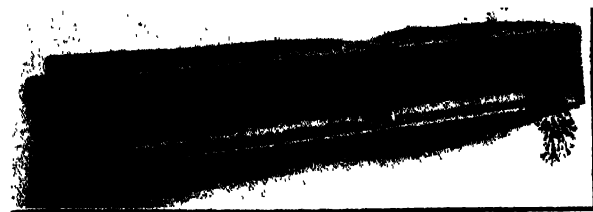
An Upset Shaft
(100 diameters)

for matching rolls. Production is decreased also, because of the necessity for lower mill speeds than are usual in rolling practice.

In addition to working out the patented features of roll construction and mill design, a long and costly series of experiments was necessary before continuous die-rolled products could be marketed and sufficient data collected to predict with reasonable accuracy the performance of any given variable section. Conversion is made on the usual basis of one gross ton of billets

1400 business organizations within the membership of the chamber.

Some business men who have followed closely the railroad situation since the roads were turned back to private control, see a drift toward Government ownership and operation unless there can be worked out some plan by which the roads can be put on a self-supporting basis. They feel that the transportation act should be given a longer trial and that attempts which are being made in Congress to amend the act, if successful, will precipitate a crisis which may make it impossible for the roads to continue under private management. As yet, in their opinion, such an increase in earnings as has been attained may have been reached at the expense of proper maintenance.



The Rolling of Front Axle I-Beams Presents a Problem Because of the Marked Variations of Cross-Sectional Area

to one net ton of bars, the bar weight including any flash or gates between impressions of course.

The size and length of pieces produced by continuous die rolling are limited only by the capacity of the mill and the diameters of rolls that can be accommodated in the housings. The equipment operated by the Witherow Steel Co. covers sections from 5/16 in. in diameter to 3-in. squares; and the lengths of individual impressions may vary from a fraction of an inch to 17 1/4 ft., rolls 68 in. in diameter being necessary for this length. The application of the product of this process is largely a matter of the study of local conditions in any manufacturing plant, but the automotive industry generally offers a wide field for its consumption by reason of its

The California Foundrymen's Association, one of the oldest organizations of employers in San Francisco, has disbanded and amalgamated with the California Metal Trades Association. Walter W. Johnson, Union Construction Co., was elected president, and M. E. Wright, Atlas Imperial Engine Co., vice-president, at the annual meeting of the Metal Trades Association. The annual banquet of the association will be held early in January.

In the course of the study of heat treatment of non-ferrous alloys, in progress at the Pittsburgh Experiment Station of the Bureau of Mines, annealing experiments are being carried out on leaded brass tubing for the purpose of examining the effect of temperature on the hardness. Tensile tests have been made of heat-treated non-ferrous alloys, and metallographic examinations made.

The Dodge Mfg. Co., Mishawaka, Ind., has declared a dividend of 1 per cent on the common stock, a decrease of 1/2 per cent from the last previous dividend in October. The regular quarterly dividend of 1 1/4 per cent on the preferred stock was ordered paid Jan. 1.

Cost Accountants Indorse Standard Invoice Form of Purchasing Agents

At the last meeting of the executive committee of the National Association of Cost Accountants, on the recommendation of C. H. Smith, director-in-charge of standardization, a resolution was adopted indorsing the standard invoice form recommended by the National Association of Purchasing Agents. Mr. Smith has prepared the following brief history of the movement:

The vast conglomeration and variety of printed forms has been a bane of existence to every man connected with any of the clerical branches of a business organization. At the convention of the National Association of Purchasing Agents in October, 1918, the cry for a standardization of the invoice form again made itself heard. The convention appointed a committee to take up the subject and report at the next meeting. This committee immediately entered upon a campaign of intensive work. They engaged the interest of some 275 associations and 125 trade papers and asked for their co-operation. In September of the following year a tentative standard invoice form was presented to a conference in Philadelphia. At this meeting representatives of the United Typothetae of America, as well as other trade associations and purchasing agents were present. Three other tentative forms were submitted for consideration. Nothing definite was done, however, and the following year another standardization conference was called in Chicago on Oct. 9, 1920. Here a fifth form was developed, and this last one was finally approved by the various associations present, which included the Typothetae, the American Railway Association, the National Association of Purchasing Agents and numerous other trade and professional organizations. Following this conference the National Association of Purchasing Agents approved unanimously the form as evolved in Chicago.

Form Corresponds to Bank Checks

The one factor which finally influenced its selection was that it would conform with the size of the standard form of bank checks, which had been adopted by the American Bankers' Association in January, 1909. This check was not only adopted by the Federal Reserve Board at its organization in 1914, but also by over 100,000 business houses throughout the country. From this standard check form there was evolved the standard voucher size.

The committee having in charge the development of the invoice considered that, because so many firms were filing copies of invoices with copies of vouchers, that they should be of such a size so as to file together conveniently. Thus it was that the size of $8\frac{1}{2} \times 7$ in. was adopted as the controlling standard for invoices, which is the same size as the standard voucher and twice the size of the standard bank check, which is $3\frac{1}{2} \times 7$ in.

In order to accommodate invoices of larger size it was decided to have the dimension $8\frac{1}{2}$ in. remain the same in all cases, but that the other might vary between 7 in. and 14 in., the idea being that anything over 7 in. would be folded back on the 7-in. line, thus providing always a sheet $8\frac{1}{2} \times 7$ in. for filing purposes. To accommodate the printer and lithographer a tolerance of $\frac{1}{8}$ in. in either dimension was provided for, so that invoices, when padded, could be trimmed to the proper size.

It is recommended that where invoices are longer than 7 in., dots or short rules be placed down from the top on the sides, to indicate to the file clerk the proper point for folding for filing purposes. It is also urged that all invoices be cut from 17 x 22 or 17 x 28-in. stock. It finally might be pointed out that it is not necessary, in every instance, to utilize each and every blank provided on the form. For example, if there was no contract number that space on the form would be left blank. In a similar way other spaces on the form may not apply in each and every instance, but the form is expected to cover a large majority of cases without the need of a rubber stamp, which has been the case heretofore.

It is customary with all corporations to use rubber stamps on invoices received to provide certain blank

spaces, where individuals, approving invoices, may insert their initials to show that the prices, calculations and other features are correct. This standard form carries a column reserved for the buyer, which will obviate the use of a rubber stamp on millions of these invoices, thus greatly reducing the labor and expense of handling them.

Societies of Detroit Affiliated

The affiliation of the architectural, engineering and other technical societies of Detroit became an accomplished fact Jan. 1 by the ratification of the proposed constitution and by-laws, acceptance of membership and election of councillors by the following twelve societies: Detroit section, American Society of Civil Engineers; Detroit chapter, American Association of Engineers; Michigan chapter, American Society of Heating and Ventilating Engineers; Detroit post, Society of American Military Engineers; Detroit section, American Society of American Mechanical Engineers; Detroit-Ann Arbor section, American Institute of Electrical Engineers; American Institute of Chemical Engineers; Detroit Engineering Society; American Chemical Society and Detroit Chemists; Michigan chapter, American Institute of Architects; Detroit section, Michigan Society of Architects; Detroit chapter, American Society for Steel Treating.

The permanent council met and organized Dec. 13, 1921, and elected officers for 1922 as follows: Chairman, P. W. Keating; vice-chairman, A. A. Meyer; secretary-treasurer, Walter R. Meier.

A central office will be established for conducting the business of the several societies. In the past, the several societies each held a number of meetings throughout the year. Most of the societies met regularly once a month and some of them two and three times a month. In the past the meetings of the various societies have often occurred on the same date. This conflict of dates will hereafter be avoided as the office of the new association will schedule the dates of meetings of all the technical societies. The Associated Technical Societies of Detroit will provide one meeting each month and this meeting will be under the management of one of the member societies. This member society will provide the speaker on a broad subject of interest to the members of all the technical societies.

The paramount use given for the new association to its members and to the public is an opportunity for public service both for the city of Detroit and for the state of Michigan. The association will take an active interest in all matters wherein engineering, architectural and technical subjects are an important factor. The council will study the opinions of the membership and will assist in furnishing definite and accurate information to the public.

The papers to be read at the iron and steel meeting of the Meriden, Conn., branch of the American Society of Mechanical Engineers, at the Home Club, Colony and Foster streets, Meriden, Jan. 19, are the following: "Development and Manufacture of Furniture and Truck Casters with an Outline of the Growth and Progress of a Modern Plant Producing these Wares," by William A. Schenck, first vice-president Bassick Co., and J. A. Johnson, chief engineer of the M. B. Schenck division of the company. "Some Relations Between the Properties of Iron and Steel and their Crystalline Structure," by Bradley Stoughton, consulting engineer, New York.

The January meeting of the Washington Chapter of the American Society for Steel Treating will be addressed on Friday evening, Jan. 20, in the ballroom of the Harrington Hotel by T. H. Nelson, steel works manager Henry Disston & Sons Co., Philadelphia. His subject is "A Comparison of American and English Methods of Producing High Grade Crucible Steels."

Hyatt roller bearings are to be used for the main tables of the 84-in. blooming mill of the Allegheny Steel Co. at Brackenridge, Pa.

Tandem Rolling of Cold-Rolled Steel

Special Equipment Developed for This Purpose, Including
Rolls and Their Housings, Wire Straighteners, Edge
Rolls, Turk's Head and Cross Slides

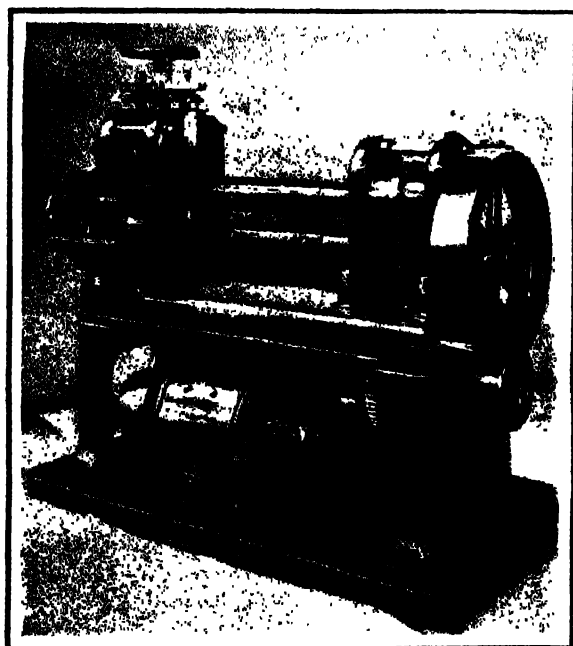
A NEW method used in producing cold-rolled wire and flat steel stock by the operation of rolling mills in tandem is introduced by the Standard Machinery Co., Auburn, R. I. By this method production of both light and heavier work is increased approximately 100 per cent, with a lower labor cost than by other multiple simultaneous rolling operations, and with safety to the operator. The process involves new features in rolling mill construction and attachments, as well as the electrical control of the roll speeds, and the introduction of new coiling reels for taking care of the stock after it is rolled. In dealing with these new features, however, further reference to the reels is omitted, because they relate to a separate machine and therefore a separate proposition.

In reducing from the round wire stock to the flat

end. It carries the coolant to the extreme further end, where it escapes through eight holes to the inside surfaces of the roll. The coolant then flows back the entire length of the roll and out away through an outlet pipe. No section of the roll, therefore, is without coolant properties, an important point, as will be noted later when roll speeds are discussed.

Two photographs show a Standard mill for light work, with a turk's head or adjustable draw plate attached, the draw plate face being removed in one photo, of which mention is made later. The mill occupies 3 ft. 4 in. x 5 ft. 8 in. floorspace, and stands 5 ft. 6 in. high. It is equipped with a 7½-hp., variable speed, d.c. motor, 600 to 1800 r.p.m., and including the motor weighs 6500 lb.

Particular care is taken to incorporate rigidity in design into each mill. The ways of all housings are hand scraped, and each housing is keyed to the bed, the housings being properly alined upon the bed of the mill



General View of
Roll Set with Rolls
6 In. in Diameter
with 1½-In. Face;
the Detail View
Shows the Turk's
Head or Adjustable
Draw Plate Attach-
ment, with the
Draw Plate Face
Removed



strip the element of elongation is a serious consideration. When several mills are used, the finishing mill must operate at a speed above the efficiency point to compensate for the elongation, and the entering mill at a speed far below its best efficiency. The Standard Machinery Co. in practise has definitely established that the tandem method of wire flattening is more efficient than when any greater number of mills are operated simultaneously.

To perform the tandem process successfully, however, the rolling mills have to be "tooled up," as it were. That is, every operation is facilitated, so that the total elapsed stoppage time is reduced to a minimum. In addition, the mills are equipped with every safeguard possible, to inspire confidence in the operator as to his work and safety. By the adoption of the various attachments and width controlling devices, therefore, it is possible to reduce to a minimum the personal equation, and consequently to employ unskilled labor to operate the mills. The savings effected by the tandem rolling, more particularly on low carbon steel, obviously are important, inasmuch as one operator can now produce more than four men by the old method.

Before treating the method of setting the mills to operate in tandem, some of the construction features and attachments will be discussed. All rolls are water cooled. An intake pipe connected with city water, or, if preferred, with a force pump, enters the roll at one

before being keyed and bolted. This alinement is important in saving power. The bearings in the gear housings, as well as on the driving trains and intermediate trains, are also hand scraped, thereby insuring maximum efficiency. All bearings have suitable oil holes and cups. Where an oil hole is not accessible, it is connected with tubing so that it is unnecessary to dismantle the mill to lubricate it. In addition, the gearing and driving mechanism are protected from dust and dirt by detachable covers and guards, which also remove the possibility of accidents to the operator.

The gears in the pinion housings are of forged steel with cut teeth, and revolve in oil. The pinion bearings are of high grade phosphor bronze, and on the roll necks operate the company's standard journal bearings. The latter revolve inside hardened and ground half shells, and eliminate practically all friction that exists in a plain bearing housing. The intermediate, driving and motor gears are of cast steel with maag teeth, and all pinions, with the exception of the herringbone, are of fabroil steel with maag cut teeth. The intermediate bearings are of high-grade phosphor bronze.

After the herringbone pinions have been forged, machined and cut, they are then forced by hydraulic pressure on arbors. Aside from their powerful and rugged features, they develop a smooth and even running on heavy, light and fine loads. The character of the gearing permits the work to be held close to gage, and the work therefore is free from waves and kinks. The mills are equipped with friction clutches, self-contained cone clutches for light transmission, and rim

finger friction clutches for heavy transmission when driven by belt. Direct connected mills are direct connected by gears, and do not as a rule have friction clutches.

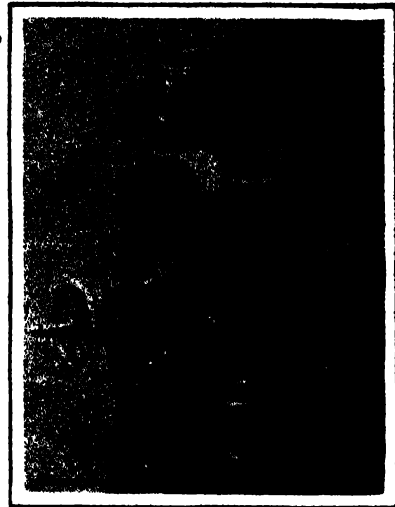
As intimated in describing the coolant system, the mills are furnished with shell rolls of the best material obtainable, well proportioned, and designed especially to withstand heavy strains. They have in this case a 4½-in. face, and are 6 in. in diameter. The wabblers

roughing pass. It is not absolutely necessary, however, to employ the straightener unless imperfect wire is used, but better rolling results are obtained by its application under all conditions of the wire to be rolled. Adjustment of the straightener is by hand screw.

Edge Rolls.—Edge rolls are used on second and subsequent passes, for width control, but are limited to passes having considerable cross-sectional area, otherwise the wire will tip or buckle in rolling the edge with



General View and Detail View of Roll Set with 8-In. Rolls of 4-In. Face. This is a much heavier outfit than that first shown. The details shows, at its left, the entering and leaving pipes for cooling liquid; it shows also the dovetail permitting lateral adjustment of the Turk's head



ends may be any of the different designs usually found in rolling mills. The journals are 3¾ in. in diameter, and 5 in. long. The gear ratio of the mill, including the motor, is 19.2 to 1, and the roll speed 63.7 to 191.1 ft. per minute, or 30.4 to 91.2 r.p.m.

Adjusting screws in the roll housings are of high carbon chrome steel, oil treated. Each mill is actuated by a single indexed hand wheel operated through a center plinon, or can also be actuated by independent screw adjustment. When the hand wheel is employed for setting down the rolls, the liability of setting one end of the top roll lower than the other is eliminated, and accurate results are thereby assured with a saving of time.

In two additional photographs is represented a mill in the same class with the one before shown, except that the rolls are 8 in. in diameter, with 4 in. face, while the diameter of the journals is 4 in., and the length 5½ in. The gear ratio of the mill, including the motor, is 25.6 to 1, and the roll speed 68 to 135 ft. per min., or 32 to 65 r.p.m., for the motor applied here is a 15-hp., variable speed, d.c., having 825 to 1650 r.p.m. This mill, as can be readily seen, is larger and heavier than the first one described. Without its bed plate, but including the motor, it weighs 7000 lb. With the bed plate it weighs 8200 lb. It occupies floor-space 3 ft. 8 in. wide and 6 ft. 6 in. long, and stands 6 ft. 3 in. high.

One illustration is a close-up view of the edging device, used on both mills. This photograph gives at the right a view of the water cooling arrangement as it enters and leaves the rolls. The second shows the mill in whole arranged for motor drive, but without the motor, and with the edging device. One photo shows part of one of these mills without either the edging device or the turk's head upon it. It is shown here for the purpose of disclosing the dovetail planed in the roll housing to permit lateral adjustment of the turk's head. This lateral adjustment permits all surfaces of the hardened and ground roll to be utilized, no matter what the size of the stock.

As to the devices and attachments, they are:

Straightener.—A wire straightener is necessary when crooked and bent stock is to be used. This device is fastened to the mill cross slide. The wire in passing through it is straightened simultaneously with the

any great pressure. The width is controlled by grooves in these rolls, which produce a finely finished edge or side.

Turk's Head.—The function of the turk's head is to limit the width of the strip while holding the thickness with exactness, and to prevent tipping of the wire under heavy pressure. It is efficient and superior to the common edging devices. Provision is made for four indexing adjustments, one on each of its four sides, making possible lateral as well as other adjustments. The range of adjustments therefore is more than sufficient for all work for which the mills are constructed. The rolling mills are so built that the turk's head can be attached to the front or the rear of the roll housings, as necessary.

Cross Slides.—Cross slides are necessary to facilitate frequent shifting of guide and attachment positions,



Close-up of the Edging Device on the 8-In. x 4-In. Rolling Mill, with Coolant Pipes at Right

and in order that both entry and exit slides may work in unison on each mill. By this arrangement there results an even wear on the entire surface of the rolls.

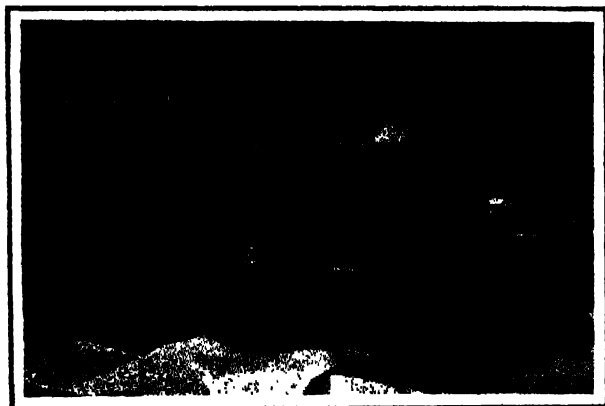
These edging devices and turk's heads are innovations in rolling mill practise. By their adoption mills of these sizes are large producers of round wire into flat stock by the tandem method because of the efficient speeds at which the mills can be operated. In addition, the element of low equipment upkeep costs, as well as low labor charges, and the low ratio of power consumed per flat stock produced by the adoption of these attachments, is significant.

The method of setting the mills to operate in tandem is as follows:

First, the two mills are used without either turk's head or edging device. These mills operate plain, and are set up one in back of the other. The third mill has the edging device attached, and the fourth mill the turk's head. Each mill has its individual motor. For illustration, assume $\frac{1}{4}$ -in. steel wire is to be reduced. With the first two mills, approximately 0.060 in. per pass is taken off. On the third mill the edging rolls edge the wire, while the turk's head on the fourth mill, operated after rolling, gages it for thickness and width, both the horizontal and vertical rolls being brought into play. The strains on the third and fourth mills are lighter than upon the first and second. By operating the mills in this manner the stock is held to a range, both in width and thickness, of 0.0005 in.

Where heavier mills are placed in tandem, the principle of operation is substantially the same, but on heavier stock it is generally customary to use only two mills in tandem, on account of the heavy strains that the large mills will take. Furthermore, on heavier mills flat stock is rolled, which naturally requires more frequent annealing on account of its size.

Another photograph illustrates a new rolling mill brought out to operate in tandem, having rolls 12 in. in diameter with 14 in. face. The roll journals in this case are 9 in. long and 9 in. in diameter. The ratio of the mill, including the motor train, is 19.6 to 1, and the roll speed 110 ft. per min. The motor used with



With Rolls 12 In. in Diameter and 14 In. Across Face, This Mill Weighs 35,000 Lb.; Its Motor, 3650 Lb. Additional

this mill is 100 hp., d.c., variable speed, shunt wound type, supplemented with automatic control, having 690 r.p.m. The mill occupies a floorspace 9 ft. 10 in. wide and 18 ft. 4 in. long, and stands 7 ft. 3 in. high. Without the motor, which weighs 3650 lb., the mill weighs 35,000 lb.

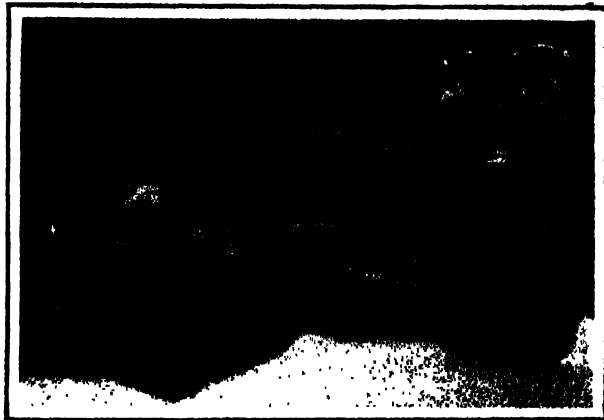
The last photograph shows a 10-in. mill operated in tandem, with rolls 10 in. long and 10 in. in diameter. The journals of this mill are 8 in. long and 8 in. in diameter. The ratio of the mill, including the motor train, is 14.6 to 1, and the roll speed, 124 ft. per min. The motor, a 75-hp., d.c., variable speed, shunt wound type, supplemented with automatic control, having 690 r.p.m., weighs 3100 lb. The weight of this mill, exclusive of the motor, is 12 tons. It occupies floorspace 9 ft. 5 in. wide and 11 ft. 4 in. long, and stands 6 ft. 8 in. high.

The design of these two heavier mills is substantially the same. The rolls are of forged steel, hardened and ground, and have independent adjustment upon each screw. The pinion housings are of forged steel of the herringbone type, operating in an oil bath. The motor and driving gears are of cast steel with maag cut teeth, while the pinions are of fabroil, steel faced, with maag cut teeth. The shaft bearings are of phosphor bronze and of the motor ring oiling type. The mills are very rigid in design, and are capable of maximum production at the speeds indicated.

In tandem rolling by the Standard method the electrical equipment constitutes a very important adjunct. It will be noted that the motors are direct current, variable speed, and that the roll speed on each mill

naturally must synchronize with the first or original mill. Such is the case, and control is in the following manner:

A special rheostat and special control are provided each mill. When the stock passes from the first to the second mill, and from the second to the third, as well as from the third to the fourth, it passes through with a slight sag that is controlled by an ordinary dancer or



Mill and Motor Weighing 13½ Tons, the Rolls Are 10 In. in Diameter, with 10-In. Face

contact roll mounted between mills. This contact roll is connected to the control and automatically governs the speed of the motor, so that a proper momentum of material going through each mill is maintained.

The rheostat for controlling the speed of each mill to compensate for elongation constantly taking place need not necessarily be constantly manipulated. Push buttons provided at each mill, for stopping all mills, can be used to advantage in taking care of an occasional irregularity in the passage of stock through the rolls. These push buttons also insure safety to the operator. The rheostats merely regulate the ratio of the various speeds. The loop of wire between the mills has always been regulated by means of an improved vertical rheostat, which will control the speed of an entry mill. Incidentally it is advisable in this method of tandem rolling to operate the finishing mill at full predetermined speed, doing all fluctuating with the entry mill. By so operating, a full capacity mill production is assured.

Starting of the mills is done automatically, provision being made, first, for low voltage, to prevent self starting after stopping; second, gravity reset time limit with overload relay, to prevent overloading; and third, field accelerating relay, for high initial torque at low speed.

The heating problem of large industrial plants is discussed in a pamphlet prepared for general distribution by the Grinnell Co. It is an engineering selling argument advancing five factors for consideration in heating costs, but emphasizing that as nowadays the fuel item is an important one, the economics of heating need consideration to an extent that did not obtain in the days of \$1 and \$2 coal. In short operating as well as first cost need an engineering analysis. A copy of the pamphlet may undoubtedly be obtained by addressing Harold S. Hall, of the company, Society for Savings Building, Cleveland.

Weights of steel rounds, squares and hexagons, in lb. per ft., are given in a blue-printed wall chart issued by the Betz-Pierce Co., Cleveland. Rounds are covered from $\frac{1}{8}$ in. to 6½ in.; squares, from $\frac{3}{16}$ in. to 4 in.; hexagons, from $\frac{3}{16}$ in. to 2½ in. In all cases the metric size is given alongside its inch equivalent. Copies of this chart will be furnished by the company on request.

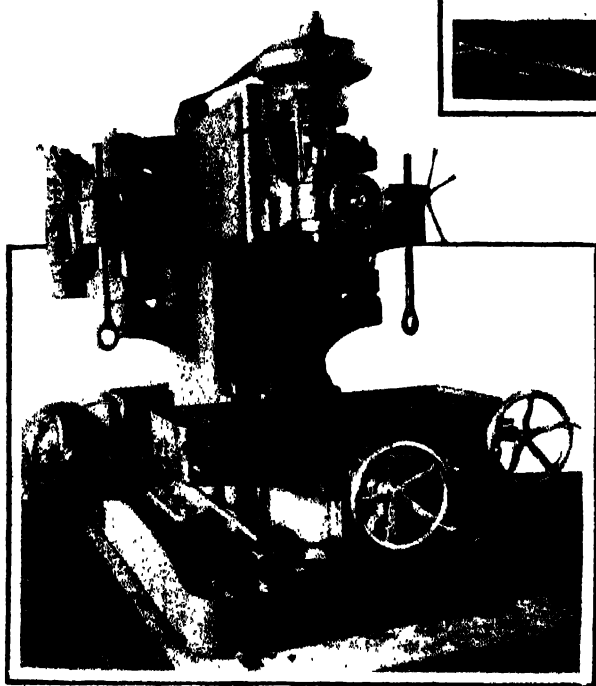
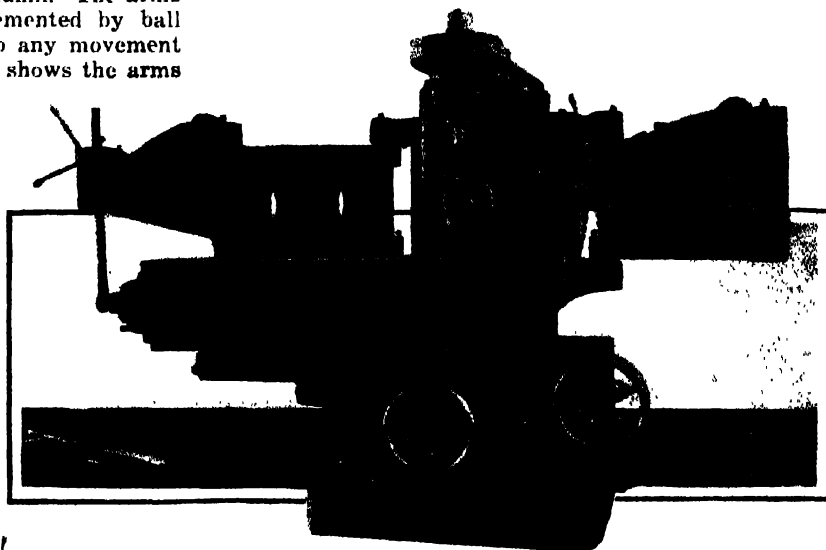
The Allegheny Steel Co., Brackenridge, Pa., has started up after a shutdown of several weeks. Three open-hearth furnaces are making steel preparatory to starting up 10 sheet mills, on Jan. 17, on a 4-day-a-week schedule.

Large Size Die Sinking Machine

A new die sinking machine with features particularly adapting it to handle large dies, has been placed on the market by the Pratt & Whitney Co., Hartford. In this design Bayrer's compensating arms are used, permitting dies up to four tons to be suspended by elevating screws and readily placed in position on the table and easily swiveled, tilted or turned on edge. The hand feeds are thereby rendered sensitive to light cuts and the die can be fed over to extreme limits for cutting gates without cramping.

In one of the accompanying illustrations of the machine the compensating arms are shown folded back and latched against the sides of the column. The arms are carried on roller bearings supplemented by ball bearings and are sensitive therefore to any movement of the die. The front view illustration shows the arms

Dies Up to 4 Tons May Be Placed in Position on the Table and Swiveled, Tilted or Turned on Edge. In the view below the arms are folded back and latched against the column, the view to the right showing arms extended supporting the die



extended supporting a die which is swiveled on the table and moved into position for a cut near the end of the die. Both of the outer carrying arms have balance beams and adjustable weights by which the load of the die can be approximately balanced and relieved from the table. Crabs attached to the ends of the die provide trunnions by which the die is supported, the trunnions furnishing the means of readily tipping the die on its side for edge cuts. When the die is being tipped in this way the table is dropped clear of the die, the arms sustaining the entire load.

The machine is of the knee type which permits elevating dies of various thicknesses to the proper height to bring the cut to a convenient level for the operator. To this end the range of the knee travel is kept unusually low down, and platforms are unnecessary. The cutter spindle is mounted in a counterweighted vertical head provided with hand feed, equipped with a graduated dial. Rapid traverse for the quick adjustment of the head is incorporated. Power to the cutter spindle is through a quarter-turn belt from the gear box in the rear of the machine and changes of speeds and feeds are made by levers at the front. Hand and power feed are provided for both the longitudinal and

cross feed of the table, and in addition, all movements of the table including elevating and depressing have rapid-power movement. The mechanism driving the power movements operates through a friction to prevent injury to parts in case of over running. A cherrying attachment can be applied to the cutter head, the drive being effected through gearing to the nose of the cutter spindle. When not in use the cherrying attachment is swung back out of the way.

The machine is equipped for either a constant-speed drive direct from a line shaft or from a motor mounted on the machine. The table top is 22 by 48 in. The table feeds are, 48 in. longitudinal, 17 in. cross feed and 15 in. vertical feed. The cutter head vertical feed is

12 in. The floor space occupied is 10 by 10 ft. and the height of machine 9 ft. The weight is approximately 16,000 lb. The machine is also made without the die-carrying arms.

Cost of Living in Five Cities

Only a moderate reduction is shown in the December figures of the Bureau of Labor Statistics, as compared with September, for the cost of living in New York, Chicago, Philadelphia, Detroit and Washington. Each city shows a slight decrease, the December average for the five being 74 per cent above December, 1914, while the September average was 77 per cent above the earlier date. In all but Detroit, the peak of housing cost or rental was in the current month, the average for the five showing 60 per cent above 1914. Food is listed as 50.5 per cent up; clothing as 95.8 per cent; fuel and light as 76 per cent; house furnishings as 117.3 per cent and miscellaneous items as 106.8 per cent above December, 1914.

1921 Exports of Industrial Machinery

Exports of American industrial machinery show an increase of some 170 per cent in value in 1921 over 1913, according to a special review of the machinery export situation by the Department of Commerce, in which figures for the first eleven months of 1921 (\$238,007,585) are used to estimate the year's trade at \$250,000,000. The impression that our foreign trade has collapsed is not justified, in so far as exports of machinery are concerned, says the industrial machinery division, in pointing out that exports of such machinery for all of 1913 were only \$92,312,457.

The contract entered into by the Jones & Laughlin Steel Co. for the purchase of 900 acres of land at Hammond, Ind., provides that the sellers must make certain improvements to the property, among which is the dredging of the Indiana Harbor canal to make it navigable for ore carriers from Lake Michigan to the site of the proposed steel plant. The sellers must also provide drainage facilities, including a large sewer which it is reported will have a diameter of 16 ft.

WAGES ADJUSTED

Tonnage Rate for Sheet Mill Workers Advanced —Tin Mill Schedule Reduced

YOUNGSTOWN, OHIO, Jan. 17.—The bi-monthly examination of sales sheets Jan. 11 to determine the tonnage rate for sheet mill workers for the January-February period disclosed an average price on shipments of Nos. 26, 27 and 28 gage black sheets shipped during the 60-day period ending Dec. 31, of 2.80c. per lb. This represents an advance from 2.75c., the average at the settlement two months before. It is the first advance in the average price on shipments by mid-Western independent mills affiliated with the Western Sheet and Tin Plate Manufacturers' Association since the settlement covering the September-October, 1920, period. At that time the average on Nos. 26, 27 and 28 gage shipments was 5.80c., representing the peak which the market attained. In the interim there has been a progressive decline at each bi-monthly examination, until the one just held.

The advance of 5c. per 100 lb. in the selling price, therefore, entitles affected employees to an increase of 1½ per cent in the tonnage rate, for each member of the crew. During January and February, sheet mill workers will be paid a rate 26 per cent above base, as compared with a rate of 109½ per cent above base when sheets were at their peak.

Average invoiced selling prices covering 1921 shipments by affected interests fluctuated as follows, according to the successive settlements: January-February, 4.30c.; March-April, 3.95c.; May-June, 3.85c.; July-August, 3.10c.; September-October, 2.75c., and November-December, 2.80c.

Tin mill workers, on the other hand, sustain a reduction of 3½ per cent in January and February, the average price of a box of 100-lb. coke tin plate primes being \$4.80 on November-December shipments, compared with \$5, disclosed at the settlement two months previous. Under the current rate, employees in tin mills are 19½ per cent above base. The peak tin plate price during the war of \$8.40 was reached in the January-February, 1918, period, at the time when tin plate was in heavy demand for containers. Workers were then paid a rate which averaged 98 per cent above the base.

In 1921 the price of tin plate varied as follows: January-February, \$7.15; March-April, \$6.50; May-June, \$5.95; July-August, \$5; September-October, \$5, and November-December, \$4.80.

The last examination was conducted at Youngstown, James H. Nutt, secretary of the manufacturers' association, acting for the employers, while D. J. Davis of Pittsburgh, assistant to the president of the Amalgamated Association of Iron, Steel & Tin Workers, represented the employees.

Proposed Transmission Line for Puget Sound Company

SAN FRANCISCO, Jan. 11.—The firm of Stone & Webster is considering the construction of a transmission line for the Puget Sound Light & Power Co. from Snoqualmie Falls, 36 miles east of Seattle, to the Wenatchee Valley, Wash., a distance of 110 miles. The local representative will leave in a few days for the North, when investigations will be started.

The line will be carried on steel towers and will be equivalent to No. 0 gage copper, stranded. It is expected that the current will be stepped-up at Snoqualmie Falls from the Falls plant, and from other plants owned and operated by the Puget Sound Light & Power Co., from 60,000 to 110,000 volts, and in the Wenatchee Valley will be stepped-down to various voltages, suitable for distribution. The plan of spacing has not been decided yet, but as it is in a mountainous region, will probably be variable, and generally speaking from 300 to 2000 ft.

The towers will be of extraordinary construction in order to carry the wires under heavy snow conditions in the Cascade Range. There has been no estimate of the amount of steel that will be required, but a very

rough survey seems to indicate in the neighborhood of 2000 tons. This, however, depends whether the power line is for one circuit or two. The total copper requirement is said to be around 1,000,000 lb.

Will Take Census of Safety Workers

Although it is known that the metalworking industry has, because of the inherent hazards of its nature, always been among the leaders in industrial safety, it has never been established definitely how many persons in the metalworking industry are engaged in accident prevention and industrial health work, or how this industry compares with other industries in this respect. All this will soon be shown when a census of safety men in the metalworking industry, which is now being taken by the National Safety Council along with the census of safety men in all other industries and in public safety work, is completed.

Following is the form which all safety workers are requested to fill in and send to the National Safety Council, 168 North Michigan Avenue, Chicago:

Name
Company or organization.....
City..... State.....
Nature of company's business.....
Is safety your principal work?.....
Please check other activities you engage in:
Fire protection..... Legal
Health and sanitation..... Insurance
Workmen's compensation and claims..... Welfare
General executive (such as manager or superintendent)..... Educational
Engineering (other than safety)..... Industrial relations
How long have you been in your present position?.....
Technical or other special education?.....
Signed
Title

Possible Postponement of Cleveland Foundry Exhibition

Some delay in arranging the details of the Cleveland Exhibition of the American Foundrymen's Association is necessary owing largely to the need of negotiations with the new Cleveland city administration in respect to settling on the special requirements of the foundry show to be held in the Public Hall, which is so new that it has not been opened to the public. It is likely that the exhibition will be delayed to the week of May 22 instead of the week of April 24.

The new Federal coal terminal at Mobile, Ala., is about completed and will be tested at an early date. It has cost \$400,000 and has a capacity of 40,000 tons of coal and 20,000 tons of ore. Cargoes are deliverable from cars or river barges into bins or ships, and from ships into bins, cars, or barges. The terminals are expected to develop export and bunker coal business at Mobile in conjunction with Warrior River barge lines. Fuel oil storage bins were built last fall.

The Railway Supply & Mfg. Co., Cincinnati, has increased its capitalization from \$10,000 to \$600,000. The company is engaged in the railway supply business and has been operated as a part of the Joseph Joseph & Bros. Co. The company recently organized as a separate unit with the following officers: Arthur Joseph, president; Robert Orton, vice-president, and Wm. Ockrant, secretary and treasurer.

Fire destroyed the plant of the Standard Slag Co., at Sharpsville, Pa., Jan. 6, causing a loss of \$75,000. The main building, 56 x 80 ft., was destroyed. The principal loss was occasioned by damage to the machinery. The company has its head office in Youngstown and had leased the building at Sharpsville from the Shenango Furnace Co. It is stated the plant will be rebuilt. The loss is partly covered by insurance.

The plant of Smith & Wesson, Springfield, Mass., firearms, which has been closed for several weeks, reopened Monday with a 20-per cent wage reduction.

New Heald Automatic Surface Grinder

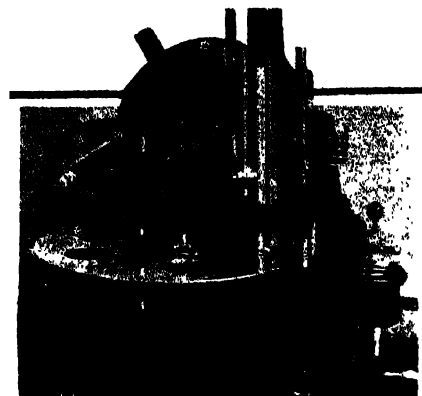
The Heald Machine Co., Worcester, has brought out a new automatic rotary surface grinding machine, known as the No. 25, designed particularly for quantity production in the grinding of piston rings, the sides of ball and roller bearing races, collars, washers, gears and similar work.

The machine is shown in the accompanying illustration. It weighs 4000 lb. net, the base casting alone weighing 1700 lb. and the wheel slide complete 700 lb. The wheel slide has wide flat and V-ways, and is liberally provided with oiling facilities. It is driven by an hydraulic arrangement operated by oil, and desired speeds can be instantly secured and the table reversed instantly without shock or noise. The reverse lever moves in the same direction that the wheel slide is desired to operate, and travel is

allowed to travel beyond its regular reversing position, until it engages two dogs attached to the wheel slide, which reverses it the proper distance for truing the wheel. The movement of the dogs not only controls the wheel slide travel, but the action of the feeding device as well.

The machine is equipped with electric contact for furnishing current for the magnetic chuck when the rings are being ground and as the disk revolves, the current automatically is shut off an instant and reversed, demagnetizing the chuck. By the time the next piece of work is slid into place the current automatically is switched on again. An automatic vertical feed can be furnished as an extra, but it is not adaptable to a machine furnished with a ring feeding arrangement.

The machine can be equipped with 8-in., 12-in. or 16-in. Heald magnetic chucks. The 8-in. chuck, when



The Automatic Feed is Used in Grinding Rings, Ball Races and Similar Work. The chuck is fed from a magazine. After the work has been ground it slides off the chuck

stopped by pulling the hand lever forward. The spindle is extra large and is of chrome vanadium steel. It is mounted in a straight plain adjustable bearing at the grinding wheel end and adjustment is made through an opening in the top of the wheel slide. No other adjustment is required, as the rear of the spindle is mounted on a self-aligning ball bearing. A sight feed oiler provides oil for the plain bearing.

The main drive shaft is on the rear of the machine, and is mounted on extra heavy roller bearings. It has a two-step cone giving two speeds to the wheel, enabling the operator to maintain an efficient surface speed throughout the life of the wheel. The chuck spindle is mounted on ball bearings and driven by spiral gears. The spindle housing is tight, permitting the immersion of the bearings and gears in oil.

When the machine is used for general work without its automatic feeding device, the chuck bracket can be adjusted to allow for grinding concave and convex surfaces.

The patented automatic feeding arrangement provided is used when the machine is to grind rings, ball races, collars, washers, etc. The automatic features of this arrangement include a feeding plate with five holes bushed to take rings up to 5 in. in diameter. As the plate indexes, a ring slides from a magazine to the center of the chuck, is ground, and then slid from the chuck. The feeding plate is indexed by a lever connected with a crank disk at the back of the machine, operated by a friction device. The disk is held stationary by a latch while the wheel slide is going forward, grinding the ring on the chuck. The latch is tripped when the wheel slide returns, the crank makes one revolution, indexing the feeding plate from one hole to the next, and at the same time sliding off the ground ring and carrying a new one to the center of the chuck.

The diamond is located on the chuck pan and an arrangement provided for giving the proper stroke to the wheel slide in truing the wheel. By lifting a dog as the wheel slide is on the back stroke, the slide is

used for rings, ball races, etc., with the automatic feeding device can handle work up to 2-in. thick. The chuck has a 7½-in. vertical adjustment, and the distance from the top of the chuck to the center of the grinding wheel is 12 in. and 4½ in. maximum and minimum respectively. In this arrangement the machine will not grind concave or convex. The 8-in. chuck, regular, on the other hand will grind concave and convex, has a face diameter of 9 in., a holding surface of 8 in., will swing 13 in. inside the water pan, has 8½ in. vertical adjustment, a maximum distance from the top of the chuck to the center of the grinding wheel of 13 in. and a minimum of 4½ in.

The 12-in. chuck has a holding surface of 12 in., a 13½-in. face diameter, a 16-in. swing inside the water pan, an 8½-in. vertical adjustment, and a maximum distance from the top of the chuck to the center of the grinding wheel of 13 in. The machine in this case will grind concave 10 deg., and convex 15 deg. The 16-in. chuck has a holding surface of 16 in., an 18-in. face diameter, a 20-in. swing inside the water pan, a 7½-in. vertical adjustment, a maximum distance from the top of the chuck to the center of the grinding wheel of 12½ in., and a minimum distance of 4½ in.

Water equipment, including pump, tank, water guard and connections are provided as extras. The machine is adapted for grinding wheels 14 in. in diameter by ¾ to 1½ in. face. For motor drive a 10 to 15-hp. motor is recommended according to the character of the work, furnishing speeds of 850 to 1200 r.p.m. The belt-driven machine requires 90 x 40 in. floor space.

The *Illustrated Anchor Post* is a new monthly publication of the Anchor Post Iron Works, Garwood, N. J. It contains brief articles on electric welding in the making of railing and gates, flange welding, factory gates and illustrations of railing and gates made by the company. The publication is in charge of Rickard & Co., New York.

German Pig Iron and Steel Production

First Complete Data of the 1919 Production and Furnace Equipment—Estimates of the 1920 Output—Comparisons with 1913

(Special Correspondence)

BERLIN, GERMANY, Dec. 24, 1921.—No detailed statistics covering Germany's iron and steel production during 1920 and 1921 have been published as yet. While some headway has lately been made in bringing the foreign trade returns for the current year up to date, production statistics are still lagging sadly behind. This delay must primarily be attributed to the lack of personnel at the offices of the federal bureau of statistics during the years of the war as a result of which material has accumulated to an extraordinary extent. One may also not be far off the mark in assuming that military, political and economic exigencies in general are largely responsible for the marked reticence shown in publishing the latest returns. When it is considered that the returns are based on data, the furnishing of which constitutes a voluntary act on the part of the industry, and when it is further considered that mills are as a rule loath to divulge details concerning plant equipment and output and the different trade organizations are showing a similar reluctance to inform the public, the difficulties in the way of an efficient statistical service will be appreciated.

The latest returns on record cover the year 1919 which in many respects will go down as one of the most exceptional years in the annals of the German industry. War had just come to an end but peace not been concluded, the army was in a state of collapse and disintegration, and the entire industrial apparatus in the course of reconstruction. Raw material stores were depleted, the supply of raw products either impossible or rendered rather difficult, the people exhausted and important parts severed from the former empire. All these factors are characteristically reflected in the production returns which show a noteworthy decline in practically every department.

Ore Mining and Consumption

Beginning with ore mining, the total tonnage of iron ore raised is given as 6,153,800 tons as compared with about 28,600,000 tons in 1913. Of blast furnace plants there were 69 with 232 furnaces toward the end of the year, the respective figures for 1918 and 1913 being 23 and 267, and 93 and 330. Consumption of iron ores and ferromanganese, including manganese ores with more than 30 per cent manganese, at the furnaces amounted to 10,592,000 tons as against 38,534,000 tons in 1913 and 18,048,000 tons in 1918. A feature of the ore supply was the notable relative increase of Scandinavian shipments and the heavy decline in the consumption of manganese ores.

Pig Iron Production

Production of coke and charcoal pig iron totaled 5,650,000 tons, comparing with an output of 9,208,000 tons in 1918 and 16,760,000 tons in 1913. A detailed survey is given in the subjoined tabulation (in 1000 metric tons).

Year	Foundry	Bessemer	Basic	Steel-making, Spiegelstein	Puddled	Scrap from Washery	Total
1919	1,872	61.0	2,584	1,521	105	1	5,654.0
1918	1,481	131.6	4,802	2,617	160	17	9,208.6
1913	3,480	375.0	9,368	2,551	464	27	16,765.0

Iron and Steel Foundries

The number of plants decreased from 1,574 in 1913 to 1,469 in 1918 and 1,468 in 1919, the number of employees from 154,300 to 123,930 in 1918 but increased

to 135,000 in 1919. Details of plant equipment are given below:

Year	Cupolas	Reverberatory Furnaces	Open-Hearth Furnaces	Crucible Furnaces	Electric Furnaces	Malleable Furnaces	Small Converter
1919	2,914	104	145	983	13	800	140
1918	2,912	108	176	1,013	14	808	171
1913	2,979	110	102	1,402	3	659	60

Attention must be called to the fact that the 1918 returns include 112 plants whose production has been estimated only and on the 1917 basis; and that 91 plants did not furnish any data. Their aggregate output was estimated by experts to be 66,404 tons and the raw material consumption at 70,907 tons. These figures are not included in the following computation of consumption and production totals.

Consumption, including scrap, totaled 2,060,000 tons against 2,277,000 tons in 1918 and about 3,680,000 tons in 1913. It is interesting to note that foundries were largely adapted to the working of scrap and old material, the consumption of which during 1919 amounted to 809,679 tons, equal to about 90 per cent of the pre-war consumption. This dependence on scrap was less marked in 1918, or 78 per cent, the respective figures being 1,459,000 tons and 1,118,000 tons. The production of foundries in 1919 was 1,820,000 tons as compared with 2,243,000 tons in 1918 and 3,340,000 tons in 1913.

Wrought Iron

The number of plants and furnaces in existence at the end of the year were 16 and 153, respectively, (1918, 18 and 192; 1913, 31 and 326). The heavy decline of production in Upper Silesia compared with that of the Rhenish-Westphalian district forms a striking feature. The trend of developments is illustrated in the appended table in metric tons:

Year	Total	Wrought Iron		Refined and Converted Steel	
		Rhen.- Westph.	Upper Silesia	Rhen.- Westph.	Upper Silesia
1919	48,919	21,650	13,139	1,971	70
1913	212,203	62,443	67,947	946	938

Steel Plants

At the end of 1919 there were 99 steel plants, while 108 were in existence in 1918 and 106 in 1913. The decrease in the means of production is shown in the tabulation below:

Year	Converters		Open-Hearth Furnaces	Electric Furnaces	Crucible Furnaces
	Basic	Acid			
1919	64	15	451	38	71
1918	82	23	505	46	81
1913	109	13	432	27	116

Here again, scrap was extensively used, consumption of domestic pig representing but one third of the 1913 figures as is shown in the following in 1000 metric tons:

Year	Pig Iron		Scrap	Iron Ores
	Domestic	Foreign		
1919	4,122	85	3,387	102
1918	7,805	—	5,252	178
1913	13,282	45	5,579	297

The decrease is chiefly due to the cession of Alsace-Lorraine and the temporary elimination of the Saar district, the total production in Lorraine, the Palatinate and the Saar district amounting to 4,400,000 tons or 25.7 per cent of the German total. The total output for 1919 was 6,877,000 tons only against 11,829,600 tons in 1918.

Rolling Mills

The number of plants in existence in 1913 declined

from 174 to 153 in 1919. The subjoined table shows the relation in the production of semi-finished material and finished products in metric tons:

Year	Semi-Finished	Finished
1919	1,132,000	5,230,000
1918	2,028,400	8,775,000
1913	2,958,000	13,119,000

Estimates for 1920

As already stated, no detailed returns for 1920 have been issued yet. According to a statement by the Verein Deutscher Eisen und Stahl Industrieller (Federation of German Iron and Steel Industries), 5,550,000 tons of pig iron and 7,710,000 tons of steel were produced in 1920. If these figures are correct, they would indicate a decline in iron output by 104,000 tons com-

pared with the 1919 production (using the figures of the bureau of statistics for the comparison) and an increase in steel production of 978,000 tons over 1919.

A recapitulation of the production data expressed as a table is as follows:

Year	Pig Iron	Steel Ingots and Castings
1919	5,654,000	6,782,000
1918	9,208,600	14,072,000
1913	16,765,000	17,340,000
*1920	5,550,000	7,710,000

*Not official.

These data cover Germany proper and evidently do not include Lorraine and Luxemburg.

BELGIAN EXPORT PROSPECTS

Despite British Competition Exports Increase—
Cheaper Coke More Furnaces Blown In
(Special Correspondence)

CHARLEROI, BELGIUM, Dec. 17.—Despite the decline in shipments to the United Kingdom and keener British competition, sentiment in the iron and steel market is improving as other foreign business increases. Producers have every reason to consider the future hopefully as, with the exception of wages, production costs are decreasing.

After several months of protracted deliberations between the Government and pig iron and coke producers, an agreement has been reached to reduce coke prices 15 fr. per ton. Further measures for lowering the price of coke are reported and another cut in coke prices in January is anticipated. Belgian and French collieries will probably be forced to make substantial cuts in coal quotations, as British exporters are now offering stocks, c.i.f. Charleroi, below the quotations of local collieries. Negotiations by the industry for a reduction of freight rates on export shipments have been pending for some time.

British competition in Continental markets is no longer confined to semi-finished material, but includes pig iron and bars. It is difficult to see how British producers can sell on the Continent at a profit, but it may be largely accounted for by the necessity of maintaining the position of British industry in world markets, even at a temporary loss.

In pig iron, Belgian exports have been placed at a disadvantage by the recent reduction in Cleveland iron, but the tone of the market is still strong. Active buying during the past few weeks has caused a scarcity of material, causing several plants to arrange for blowing in a number of blast furnaces.

The Thyse-Chateau works at Marcinelle is blowing in one of its blast furnaces which has been idle since last June. At Chatelineau one furnace will shortly be blown in. The Société Métallurgique de Sambre et Moselle is planning to start up one stack by January. Two furnaces have been relighted at the Ougrée and two at the Espérance Longdoz works. Furnaces are also ready to resume operation at La Louvière (Société Boel) and Monceau (Société Monceau-St. Fiacre).

Foundry iron No. 1 is quoted at 265 to 275 fr., No. 3 at 240 to 250 fr., basic at 235 to 245 fr. In semi-finished material the scarcity continues, as most of the output is being retained by the producers for their own consumption. Lorraine producers are averaging three months' delivery, while the terms of Luxemburg works for moderate tonnages are about 10 to 12 weeks. Sheet bars are quoted at 410 fr. per ton.

The upward trend of bar iron prices has been halted by the lowering of quotations in the United Kingdom and increasing competition in Holland, the latest quotations being 420 to 430 fr. for wrought iron bars No. 2, and 450 to 460 fr. for No. 3, while mild steel bars have been quoted at 455 to 465 fr., all for domestic delivery. Export prices for mild steel bars average 440 fr. The pipe and tube market shows a further improvement, but conditions in the wire and rail markets are less satisfactory. A decidedly stronger tone

prevails in sheets, prices tending upward. Heavy sheets, basic, are quoted at 515 fr., medium sheets, basic, according to gage, 620 to 650 fr., and light plates about 840 fr. Steel hoops bring £11 to £11 10s., for export, f.o.b. Antwerp. Domestic prices for hoop iron are firm at 660 to 675 fr.

British Pig Iron and Steel Output for December and for 1921

LONDON, ENGLAND, Jan. 13.

The production of pig iron in Great Britain in December was 275,000 gross tons and that of steel ingots and castings 381,000 tons. These compare with an output of 271,800 tons of pig iron and 442,800 tons of steel in November.

The production of pig iron and steel in Great Britain in 1921, as compared with 1920, according to National Federation of Iron & Steel Manufacturers, was as follows:

	Pig Iron		Steel Ingots and Castings	
	1921	1920	1921	1920
January	642,100	665,000	493,400	754,000
February	463,600	645,000	483,500	798,000
March	386,000	699,000	359,100	840,000
April	60,300	671,000	70,600	794,000
May	13,600	738,000	5,700	846,000
June	800	726,000	2,700	845,000
July	10,200	750,600	117,200	789,900
August	94,200	752,400	434,100	709,200
September	158,300	741,000	429,300	884,700
October	235,500	533,200	405,400	544,300
November	271,800	403,200	442,800	505,100
December	275,000	682,500	381,000	746,600
Total	2,611,100	8,007,900	3,624,800	9,056,800

These data compare with 7,398,000 tons of pig iron and with 7,894,000 tons of steel ingots and castings in 1919.

The 1913 production was 10,260,000 tons of pig iron and 7,668,000 tons of steel ingots and castings.

Will Sell Shell Steel

WASHINGTON, Jan. 17.—Bids will be received until Jan. 31, by the Ordnance Salvage Board of the War Department, at Chicago, on approximately 31,491 tons of shell forgings located at Columbus and Toledo, Ohio, and Savanna, Ill. The bids will be accepted on the total quantity of all three lots or the entire quantity of one or more lots. The forgings are rough and semi-finished and are said to be suitable for charging box scrap. They will be sold without regard to analysis of material, quality, quantity or condition.

The salvage officer at the arsenal at Rock Island, Ill., will receive bids until Jan. 27, for the sale of a large quantity of surplus building material at the arsenal. Included in the list of material are approximately 30,000 lb. of sheet lead of various dimensions; cast iron floor plates; structural steel; 36,000 bolts and nuts in various sizes; anchors and tie bolts; and over 20,000 lb. of railroad and boat spikes.

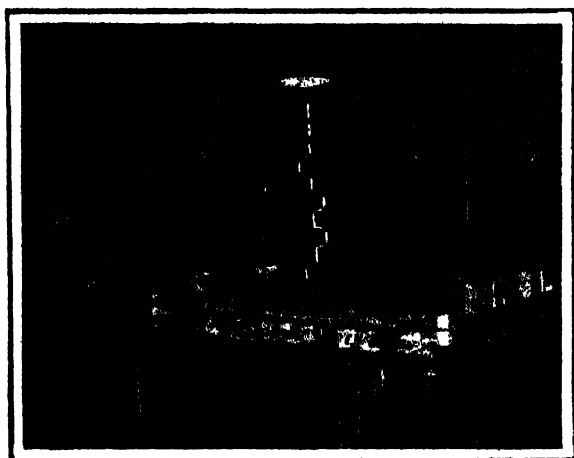
CASE HARDENING A CRANKSHAFT

Method Developed by Franklin Motor Car Co.—
Only Wearing Surfaces Treated

In the case hardening of crankshafts as developed and put into a regular production proposition by the Franklin Motor Car Co., Syracuse, only the wearing surfaces are treated, the object being to secure harder surfaces for the main and throw bearings. The results from exhaustive tests are said to indicate that the wear of the case-hardened shaft is only one-sixth as much as on the company's former production crankshafts, tested under similar conditions. It is said that the life of the heat-treated bearings is three to four times greater than that of the soft crankshafts.

In the beginning of the process of case hardening, the wearing surfaces are wound with tape. The shaft is then dropped into a copper plating tank as shown, the copper protecting the exposed parts which

The Dipping of the Crankshaft into the Copper Plating Tank Is Shown Below. At the right the crankshaft is shown placed in the hardening die, or straight jacket, and being quenched. The hardening die serves to prevent distortion



ity of forming a joint agency of manufacturers under the auspices of the association, for the collection, production and distribution of industrial motion pictures. It is also suggested that a report be made on the plans and methods for carrying forward such a project if the conference should deem an undertaking of this character to be advisable, and that the Bureau of Foreign and Domestic Commerce be asked to participate in such a conference.

Iron and Steel Production in Canada

The production of pig iron in Canada during November was fairly well maintained, the total output of basic iron amounting to 41,232 long tons as compared with 42,356 tons in October. With the exception of some 300 tons the whole output was produced by makers for their own further use. Foundry iron fell off slightly from 7217 long tons in October to 6348 tons in November, practically all of which was produced for sale. No malleable iron has been made in Canada since



are not to be hardened by preventing the penetration of the carbonizing gases.

The shaft is then packed into a box containing carbonizing material, each box accommodating three shafts. The box is sealed with fire clay and placed in the heating furnace where it is kept for 24 hr. at a temperature of between 1600 and 1700 deg. Fahr. The box is then removed and the crankshafts permitted to cool. They are then reheated to 1450 deg. Fahr., after which they are quickly placed into the hardening die, as illustrated, and then quenched. The hardening die, or "straight jacket," as it is called, holds the shaft rigidly, effectively preventing distortion.

After coming from the case-hardening room there are two grinding operations and a certain amount of aligning of the shaft to be done.

Will Confer in Regard to Moving Pictures

WASHINGTON, Jan. 17.—Based upon responses received from industries and upon the activities of the Department of Commerce, which also has interested itself in the question, Nathan B. Williams, associate counsel of the National Association of Manufacturers, has made a report to President Edgerton recommending that the board of directors of the association invite manufacturers who have industrial motion pictures or who are interested in the subject, to a conference to consider the question of production and distribution methods now employed by manufacturers using motion pictures. The recommendation suggests the advisabil-

August, and no electric castings since September. The quantity of the last named commodity produced, however, is always small and is entirely the product of electric furnaces. No electric iron was made in either October or November, but contracts awarded for the manufacture of rails kept two furnaces in operation at Sault Ste. Marie, Ont., and two at Sydney, N. S., while the varied interests of the Steel Co. of Canada, Hamilton, Ont., permitted the operation of one blast furnace. These five furnaces, all of which were in blast at the beginning of the month, were the only units operating during the period under review.

The output of ferroalloys showed a creditable increase from 1266 long tons in October to 1683 tons in November, in spite of the fact that only two plants were in operation. No spiegeleisen was made during the month, the output of ferroalloys consisting entirely of ferrosilicon in grades from 15 to 75 per cent.

The production of steel ingots and castings showed a decided improvement for November, the output rising from a high record of 72,204 long tons in October to a total of 75,039 long tons in the month of November. Of the November output 73,806 tons was made by the producers for their own use in the manufacture of steel rails. A small tonnage was produced for direct sale, the total under this item being 1233 long tons, practically all of which was in the form of steel castings.

The National Metal Trades Association will hold its twenty-fourth annual convention at the Hotel Astor, New York, on April 19 and 20.

Worm Gear Drive for Line Shafting

Following the modern tendency to inclose all gears and other moving parts the Cleveland Worm & Gear Co., Cleveland, has developed the inclosed worm gear drive shown in the illustration, for the operation of line shafting with direct right-angle drive from the motor shaft through the worm and worm wheel to the line shaft. It is pointed out that this drive possesses various desirable features among the most important of which is that it permits the use of smaller, high-speed motors operating at 1800 r.p.m. and that not only is the first cost much less because of the use of smaller motors, but they have the added advantage of a higher power factor and higher efficiency which tend to give better starting conditions for the motor. The ease with which large ratios of reduction can be obtained with



Where Steel Girders Are of Sufficient Strength, the Unit Is Mounted on the Steel Work

the type of worm drive used, which is mounted on ball bearings, permits the use of this drive on high or low speed line shafts.

The drive runs in a bath of oil in an oiltight and dustproof housing, the case being filled with oil to the petcocks and about every three months drained, washed out and refilled with fresh oil. It is stated further that as there is no slip, the power being uniformly transmitted by the worm and wheel, the drive is a desirable one to use in manufacturing processes that require a constant application of torque. The drive operates with practically no vibration or noise and may be mounted with the motor on a cast-iron bed plate attached to the ceiling as shown in the illustration. Where the steel girders are of sufficient strength, the unit may be mounted directly on the steel work.

The efficiency of this drive is stated to be approximately from 93 to 97 per cent, depending upon the ratio of reduction. The unit stresses are kept at a minimum to insure long life with practically no interruption of service. The necessity of shutdowns because of broken driving belts or chain is eliminated. As the drive is totally inclosed, no guards are required to cover moving parts nor is it necessary to make adjustments for wear.

Safety Meetings for Carnegie Plants

A course of safety lectures for the instruction of the workmen of the Edgar Thomson Works, Carnegie Steel Co., and other plants in the Braddock, Pa., district, has been arranged by the safety organization of the Edgar Thomson Works, O. J. H. Hartsuff, general superintendent. Last fall a series of safety lectures for the foremen of the district was conducted by the Braddock plants. The current course for the education of workmen is modeled after the successful course that preceded it. At each session, in addition to the speaker, music is furnished by organizations from the local steel plants, supplemented by readings and musical perform-

ances by volunteers from the district. Several playlets are now being rehearsed in which employees of local mills will enact scenes from everyday life in the steel mills which carry a lesson in safety to the audience. John B. Trusel, safety director of the Edgar Thomson Works, is chairman of the committee arranging the course. The first session was held Thursday evening, Jan. 12, with an address by John A. Oertel, safety director of the Carnegie Steel Co. E. S. Willis, who conducted the safety course held for the foremen last fall is in charge of the present course.

First Sectional Meeting of the American Society for Steel Treating

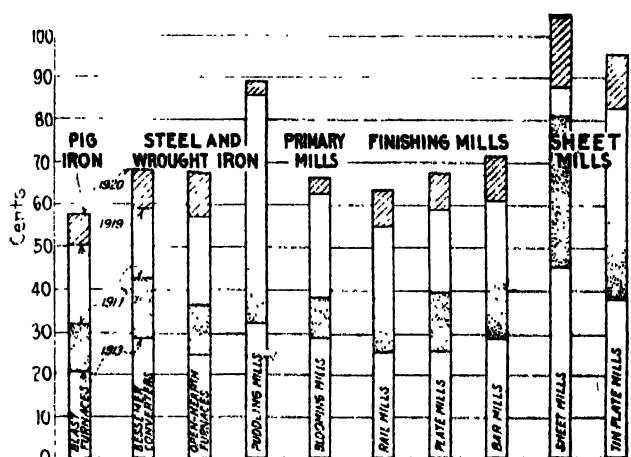
The first of two sectional meetings of the American Society for Steel Treating, to be held in 1922, is scheduled for March 3 in New York, under the auspices of the New York Chapter. The meeting is to embrace the members of all the chapters in the eastern territory, including Syracuse, N. Y., and Washington.

The meeting is distinctly a technical one, at which six papers on various heat treatment subjects are to be presented by members of the various chapters. These are to be pre-printed and an extended discussion is aimed at. The papers are to be presented at an afternoon and evening session. An informal dinner is scheduled.

The second meeting of this nature is to be held in Pittsburgh some time in May. At both meetings an invitation is to be extended to the members of other technical societies in the vicinity, urging their attendance and participation in the discussions. The program for the March meeting will be available soon.

Wages in Iron and Steel Plants

In the chart, the average earnings of all employees in each of the ten departments mentioned are shown separately for 1920, 1919, 1917 and 1913, except that



the 1917 figures for puddling mills, rail mills, bar mills and tin plate mills are missing. The top of each column represents the average 1920 hourly earning; the bottom of the upper shaded section shows the earning for 1919; the top of the lower shaded section, that for 1917, and the bottom of the lower shaded section, that for 1913, as indicated at the left. From this it will be easy to compare department with department at any given date.

This chart was inadvertently omitted from page 156, THE IRON AGE, Jan. 12, where some of the detailed figures are given on which the chart is based.

The Philadelphia Foundrymen's Association, at its annual meeting, Jan. 10., re-elected Thomas Devlin of the Thomas Devlin Mfg. Co., president. R. C. Spare, American Manganese Bronze Co., was elected vice-president, succeeding George C. Davies of Pilling & Co., pig iron merchants. Howard Evans of the J. W. Paxson Co., was re-elected secretary and the same executive committee will serve for another year.

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ESTABLISHED 1855

THE IRON AGE

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The Future of the Trade Associations

Unexpectedly small concern is shown over the right of the so-called open price trade associations to exist. Their members commonly believe they have kept in the right path, but they are disposed to question the present need of association activities. This view grows out of the mood which raises an interrogation on every expenditure. The uncertainty created by the so-called hardwood decision of the Supreme Court gives the cue to the member for chopping off the association assessment. Only a portion of the members recognize in times like these the value of definitely discovering signs of a turn in the consumption as well as in the production trend and of checking the shrewd moves of opportunist buyers. The average manufacturer is an average man and he finds it hard to take from his surplus or to extend his credit when there is little promise of early reward. Thus the association is weakened financially and its activities crippled.

That organizations of competing manufacturers have been studiously innocuous, since the first finding against the now famous hardwood association nearly two years ago, has not made for tight bonds of membership. The business depression, too, has caused many to forget what the associations have accomplished. Legal advice, as always, has been a safeguard, but the close decision of the Supreme Court in the hardwood case has shaken confidence in the opinions of legal advisers.

It remains that the association members do not care to test their contentions of entirely legal conduct by being parties to a Government suit. The attitude, as stated, is one influenced largely by the lean pocketbook. It shows the distorted perspective in which many view their problems in the depths of a depression. The result may be the cessation of practices close to the border line, even though many of the benefits of the past be given up. Thus small associations may find it difficult to retain a sufficiently large percentage of the industrial or trade group to make the association properly efficient or influential, and industry generally will be the loser.

It is yet to be seen how far the abandoning

of associations will check Government efforts to help business, as through the Department of Commerce. Before long a clear pronouncement may be expected. The Chamber of Commerce of the United States has made a good move in starting a special investigation. Meanwhile, it behooves the trade associations to go slowly in taking steps to disband and thus destroy a usefulness which it has taken long, hard work to build and maintain.

Steel Demand for Replacements

In September, 1918, the rate of steel ingot production in the United States was approximately 47,000,000 tons a year. In March, 1920, a rate of 45,000,000 tons was attained. One of these high points was reached during the war, the other more than a year after hostilities ended. Last July the rate was approximately 11,000,000 tons. At the beginning of last November it was probably not far from 25,000,000 tons. Never before in the history of the steel industry were there such wide swings in the operating rate, and the present seems like a strange time in which to suggest that in future years the production of steel is likely to be at a steadier rate than used to obtain, yet there is some reason to suppose that the steel trade is approaching a period in which demand and production will run along more uniformly than has been the average experience in the history to date.

The swing in production down and back in 1921 was based on circumstances quite unlikely to be repeated. Late in 1920 and early in 1921 stocks of steel and of various manufactures of steel piled up because men did not realize suddenly enough the extent of the readjustment that had begun. The liquidation of these stocks was the chief cause of the special dip in the rate of steel production last summer, the production at that time being no measure of the then current rate of consumption. This dip, therefore, may be disregarded, and we should consider that recent experience was of consumption being reduced only by one-half, not by three-quarters.

Leonard P. Ayres, vice-president of the Cleveland Trust Co., has made a careful study of the automobile trade. By taking the production of

passenger vehicles and dividing it into Fords and "all other" he has seen a point which the superficial observer, glancing simply at tables showing "the production of automobiles" has missed. Mr. Ayres finds that the production of "all other" increased rapidly up to and including the year 1916, and that since then the production has increased but slightly. The spread of the automobile has been downward into the ranges of smaller purses, and the production of the Ford car doubled from 1916 to 1920. Mr. Ayres reaches the conclusion that it is a practical working rule to assume that the life of an automobile is six years and that without expansion in the use of the automobile one can count upon a demand in a given year equal to the production of six years earlier.

This is precisely the sort of rule the steel trade has been wishing it had for each class of steel consumption. Even a few such rules, applicable to some of the important classes of steel consumption, would prove very helpful. For instance, in every one of the three years, 1905, 1906 and 1907, more freight cars were built than in any preceding or subsequent year. A large part of that work was in the building of steel cars to replace wooden cars. If steel cars had a definite and uniform life we would know when to look for replacement orders.

While it may not be possible to formulate such rules, one can generalize to the extent of saying that as the total amount of steel in service grows the average annual replacement requirements must grow. As an index the statistics of pig iron production are, of course, better than the statistics of steel production. At the beginning of 1882, 1892, 1902 and 1912, the condition was in each case that of all the pig iron that had been made up to that time approximately one-half had been made in the preceding ten years. That is an index to the newness of the store of iron and steel in use at any date in the period. Up to the beginning of 1912 about 440,000,000 tons of pig iron was made, but in the past ten years the production, minus the equivalent represented in regular exports and our own war material sent abroad, was hardly more than 270,000,000 tons. Instead of equaling 440,000,000 tons, it was only about 60 per cent of that amount. Thus the average age of the material we now have in service is considerably greater than in the other periods named, and we are at a time when the ratio of replacement demand to expansion demand is decidedly higher than formerly.

Fighting by Injunction

A very unusual if not unprecedented decision was given a few days ago in the Supreme Court in New York by Justice Robert F. Wagner, who held that the Cloak, Suit and Shirt Manufacturers' Protective Association was guilty of breaking a contract in attempting to establish piece work and the 49-hour week in the shops of its members. He permanently enjoined the association from pursuing what he finds is a conspiracy. Although an officer of the union hailed the decision with de-

light and announced that the employers would be sued for an amount "running into the millions" on account of wages lost since the strike was declared last November, some of the union men are not at all satisfied with the victory and one of their attorneys asserted that he was by no means converted to the opinion that court injunctions are the proper method of adjusting industrial disputes.

Certainly it must be conceded that if the contending sides in a strike fight each other by injunctions, it is better than to resort to violence which so often has been the labor union's method of securing its ends. In fact, the decision seems to put the participants on a higher plane and might suggest a further argument for incorporation of unions so that decisions could be more easily and effectually enforced. As the court said, "the fact that the employees entered equity's doors by a hitherto untraveled path" does not lessen their right to the law's decree. They are placed in the position of respecting courts and injunctions and that is an unusual attitude for many of the labor agitators.

In the last analysis the issue comes down to a matter of fact. If the employers in any case violate a contract, they ought to be held responsible, just as the employees should always be held responsible for any contract which they have made. If labor leaders are compelled to give up their defiance of the courts and take their chances when they submit disputes to legal decisions, there will be reason for believing that real headway has been made on a problem on which there has been so much traveling in a circle.

Labor's Share in Steel

Although the rapid progress of events has made the census figures for manufactures of 1919 decidedly out of date, yet some interesting deductions are to be drawn from the relations between those figures, some of which are not yet published, and corresponding figures for 1914, the previous census year. These deductions, which do not appear on the face of the returns as put out by the census bureau, follow a close and discriminating analysis of those returns.

Taking the figures for blast furnace plants, steel works, rolling mills and pipe mills, covering a total of 745 establishments in 1919, it is found that the total outlay for wages and salaries in that year was 22.72 per cent of the entire value of products made, as compared with 20.53 per cent in 1914. The element of prices is evaluated here, because both the wage bill and the products are quoted each year, in terms of the same dollar. It is thus evident that labor's share during that interval increased by something more than 10 per cent. Putting this in another way, the wages paid in 1919 amounted to 37.07 per cent of the value of the materials upon which labor, purchased by those wages, was expended. This compares with only 29.41 per cent in 1914, and shows that, in spite of the heavy increase in the cost of materials purchased, the wages of labor far outstripped it.

It has become common practice of late for self-

appointed economists, arguing in favor of labor unions, to point accusing fingers at the high salaries paid the directing minds of large enterprises. In the case of the steel mill units above mentioned, salaries in 1914 amounted to 20.71 per cent of the wage payments; in 1919 the proportion was only 16 per cent. This shows that, although the salary list has been heavily augmented, it is relatively much smaller than the wage list, when compared with operations of earlier days. From whatever angle it is considered, therefore, it is apparent that the wage earner has been getting his full share (and somewhat more) of the output of the steel industry.

Making Transportation Adequate

While many things are essential in making the foundation upon which a people may be prosperous and make progress, it is obvious that the two most important requisites are a sound medium of exchange and good transportation facilities. In all the analyses that have been made of the poor economic conditions in Europe two points have been emphasized—the absence of sound currencies and the absence of adequate transportation facilities. Conditions vary greatly in different parts of Europe, yet whatever the situation these two desiderata for improvement are conspicuous.

In the United States we have one of these two requisites, an admirably sound currency. In transportation we have something of doubtful adequacy, there being quite a range of opinion as to how poor or how good the rail transportation situation is.

The variation in opinion is due to an extent to differences in the viewpoints of individuals, but largely it is due to failure to form definite conclusions as to the quantity and quality of the rail transportation the nation requires. There has been very little quantitative or qualitative analysis of the transportation service the railroads have furnished from time to time in relation to the volume of business activity in the various lines of industry.

Let us illustrate this suggestion that rail transportation should be studied in connection with industrial activity: The iron and steel industry would like to operate at a rate involving a production of 40,000,000 or 50,000,000 gross tons of ingots a year. The bituminous coal industry would like to produce 600,000,000 tons a year. The building trades would like to see a million or so of dwelling houses built in a couple of years. Motorists and others would like to see tens of thousands of miles of improved roads built. We go on thinking and hoping that these things can and will be done, but there is nothing like careful analysis and study to determine whether the best transportation service we can expect from present facilities would permit of their being done. If they cannot be done and we should become all set for the accomplishment, we should simply run into disappointment by what we have experienced before, called a "breakdown in transportation."

It is not logical to set our minds on high

standards of performance in industry, such as those cited, without making sure that we have the requisite transportation facilities. It is plain that we have not. In 1920, with vexatious delays to shippers and heavy losses to industry from poor transportation, the railroads made their highest record in freight movement, 448,500,000,000 ton-miles. That was the maximum in quantity of service, but the quality of service was very poor, certainly not the quality shippers want. Yet 1920 was not a year of great industrial activity. It was a year of high prices due to difficulties in producing goods and securing delivery of goods and to profiteering and speculation. For nine months the steel mills, importuned by customers for heavier shipments, had their operations curtailed by 20 per cent, chiefly from lack of transportation. The coal and coke produced was far under the capacity, yet prices were outrageously high because transportation was insufficient. Road and dwelling house construction was far below what the people expect and want in future. Yet in 1920 there was not enough transportation capacity to furnish good service for the restricted amount of industrial activity in that year.

We now have logically but two choices. We must either renounce the hopes we have been entertaining of there being great industrial activity in future or we must become willing to do the work and spend the money necessary to establish the needed transportation facilities.

CORRESPONDENCE

Split Blast Furnace Shafts

To the Editor: The editorial entitled "Split Furnace Shafts," which appears on page 166 of your issue of Jan. 12, the writer has read with a great deal of interest. It furnishes us with information which apparently is not generally known.

The view you have taken that the splitting of the shells is not so much due to the fire brick as to the accumulation of metallic zinc, also zinc oxide on the brick and penetrating it, seems entirely reasonable. The remedy which you point to, viz., using heavier plates and banding the furnace, seems to me, however, only changing the effect of the expansion from one point to another. This suggestion which you make will without doubt save the shell, but on the other hand will ruin the fire brick.

The great amount of pressure which is brought to bear on account of the expansion, when the plates will not give, will cause the brick to spall off, starting on the inside. It is a well-known fact that it is next to impossible to convince any one handling a furnace, regardless of the kind, to lay the blame for spalling to anything but inferior fire brick. Therefore, your remedy does not cure, but merely relieves the afflicted part.

I would like to offer a suggestion in conjunction with that made by yourselves, not only to strengthen the shell of the furnace but to make it perhaps a trifle larger in diameter—the amount to be determined upon by those who are able to figure these matters—and between the brickwork and the shell to make a cushion of dry quicksand. With such an arrangement, when the bricks expand, they would exert the pressure against the sand rather than the shell. The shell will be practically immovable. The sand on the other hand will flow when pressure is brought to bear, and the horizontal expansion of fire brick would be taken up

by the vertical movement of the sand, provided there is provision made at the top of the furnace to take the sand forced up by this expansion. It might be that sharp sand would do as well as the quicksand. The reason that quicksand is suggested is that there is a better chance of its moving and allowing for the necessary expansion.

My interest in this matter is readily understood by yourselves on account of my connection with the fire brick industry.

JOSEPH PODMORE,

Secretary Ostrander Fire Brick Co.

Troy, N. Y., Jan. 13.

BIDS ON VESSELS

Much Interest Manifested in the Proceedings at Washington

WASHINGTON, Jan. 17.—With 17 concerns from the various sections of the United States submitting bids on obsolete naval vessels at the opening here yesterday, the interest created was even greater than had been expected. What it may indicate as to the proposed establishing of a ship salvaging industry in the country remains to be seen, but naval officials professed to see in the bidding good prospects for the creating of such an industry provided the scrapping of ships is undertaken on a broad scale as the result of the action of the Conference on the Limitation of Armaments and the maintenance of an adequate American merchant marine. While some bidders undoubtedly do not intend to engage permanently in the salvaging business, others apparently are ready to do so, while still others already have been so engaged to differing degrees in the work. The vessels for which bids were submitted included three battleships, two cruisers and four monitors. The battleships are the Maine, Missouri and Wisconsin, the cruisers the Columbia and Memphis and the monitors, the Ozark, Puritan, Tonopah and Miantonomoh.

Among the most prominent bids were the following:

Bidder	Vessels Bid On	Bids (Cents Omitted)
Henry A. Hitner's Sons Co., Philadelphia	All or none	\$235,000
Barde Industrial Co., Seattle, Wash.	All or none	213,013
*Merritt Chapman Derrick & Wrecking Co., New York	Maine	25,194
*Merritt Chapman Derrick & Wrecking Co., New York	Missouri	25,194
*Merritt Chapman Derrick & Wrecking Co., New York	Wisconsin	23,001
John Kanzler & Sons, Bay City, Mich.	Missouri	26,700
John Kanzler & Sons, Bay City, Mich.	Wisconsin	22,600
Robert McGregor, New York	Maine and Missouri, each	37,777
	Columbia	51,265
Boston Iron & Metal Co., Baltimore.		
Newport News Shipbuilding & Dry Dock Co.	Missouri	15,000

*Bids do not include 22 plates of armor weighing 506 tons which are to come off of each ship.

The Kanzler bids provide for removal of armor by the Government.

Other bidders were: The F. J. Lewis Mfg. Co., Chicago; William F. Callahan, Boston; F. J. Lucius, New York; Irvin A. Taylor, Oakland, Cal.; J. L. Barnard, Baltimore; A. H. McDonald, Washington; John S. Turner, Newburyport, Mass.; A. H. Roberts, Denver.

The bids are to be submitted by the Board of Survey, Appraisal and Sale to the Division of Operations, Navy Department, and final decision as to making awards rests with the Secretary of the Navy.

The Hyman-Michaels Co., Chicago, submitted a proposal to bring from England an official of a large wrecking company to organize, finance and operate a company in this country.

Hickman, Williams & Co., brokers, Chicago, have opened a storage yard at West Pullman, Ill., for the purpose of storing the various commodities they handle, including pig iron, ferroalloys and scrap. The yard is 300 x 600 ft. and is served by a locomotive crane. It is situated on the Chicago, West Pullman & Southern Railroad at 119th Street and Ashland Avenue.

OPEN PRICE POLICY

Government Will Issue a Statement in Regard to Hardwood Decision

WASHINGTON, Jan. 17.—It finally has been definitely determined by the Government to issue a statement regarding practices of open price associations. This proposal, which originally had been planned and which trade associations have been urging with increasing persistence since the decision of the Supreme Court in the Hardwood case, still is the subject of conference between Attorney General Daugherty, Secretary of Commerce Hoover and members of the Federal Trade Commission. Attorney General Daugherty this afternoon said that he has prepared a tentative draft outlining the attitude of the Government toward practices of trade associations with the expectation of making it public soon. This follows on the heels of the understanding that the Department of Justice had concluded not to issue the statement.

While the character of the statement to be given out is not known, it is believed that it will be scrupulously drafted so as not to cause any conflict with cases before courts or that may come before them bearing on trade association activities. It was stated by the attorney general that the Department of Justice will give its judgment to show how far such associations may go and to provide a guide for them as far as possible. The department, it was declared, desires to encourage lawful associations both by reason of constructive work they may do for the trades they represent and through co-operation with the Department of Commerce. It is the purpose of the Department of Justice to see that Government officials coming in contact with trade associations are profound in the law and also to see to it that "no ground is cut from under the Department of Justice." Intimation was made that violators of the law would be pleased to see a statement from the Department of Justice which they could use in shielding themselves in case of prosecutions. The department evidently is going to be cautious so as to avoid such a circumstance. At the same time, it was made known that a statement coming from the department is not binding and would not hold if a court should hold against its principles and such holding were affirmed by the higher court.

One outstanding benefit of such a statement, it was indicated, would be to assure continued co-operation between the Department of Commerce and trade associations, which has been lessened somewhat since the Hardwood decision. Another advantage, it was declared, might be to decrease the number of investigations of trade association activities by the Federal Trade Commission and make contemplated investigations unnecessary.

Date for Basing Point Hearing

WASHINGTON, Jan. 17.—The Federal Trade Commission has definitely set Jan. 30 as the date to begin hearings in the Pittsburgh base case and this date has been accepted by the United States Steel Corporation, the respondent. Hearings are to begin in Milwaukee and it is probable that the proceedings will be transferred to Minneapolis as the second point.

The Tribute to Steel Reprinted

Many letters have come to us asking for copies of the tribute to steel, by Henry D. Hubbard, of the Bureau of Standards at Washington, which was strikingly displayed on pages 20 and 21 of our Annual Review Number of Jan. 5. Arrangements have been made for a special reproduction of these pages on India coated paper and an extra copy will be sent to any IRON AGE reader requesting it.

SHAPING THE TARIFF

Senate Committee Agrees on Valuation Bases — Studying Smoot Amendment

WASHINGTON, Jan. 17.—The agreement of the Senate Committee on Finance tentatively determining to base the *ad valorem* import duties in the permanent tariff bill on the basis of the wholesale selling price in the United States is in harmony with the report published in THE IRON AGE of last week. The proposal is said to have the endorsement of the Treasury Department and the Tariff Commission. The duties would be based on the prices in the domestic market prevailing at the time of shipment of the imports. Details of the plan, together with other questions, are still being discussed by the Finance Committee with Treasury Department experts and members of the Tariff Commission. The plan is provided in an amendment offered by Senator Smoot. Chairman McCumber of the committee hopes to announce a definite agreement within a day or so, he said. The plan to assess duties is similar to that which was originally suggested to the House Committee on Ways and Means, which finally adopted, and had the House pass the strictly American valuation plan fixing duties on the basis of the wholesale American market of American products comparable to foreign products.

The committee is making a study of the Smoot amendment, which deals with several important features of the tariff question. One of the principal sections would authorize the President to exclude products of countries which discriminate against the commerce of the United States and is more drastic than previous provisions which have been suggested to deal with this problem. The Smoot amendment fixes the maximum of the new or additional duties which the President would be empowered to impose in retaliation for discrimination at 250 per cent *ad valorem* or its equivalent. Other amendments by Senator Smoot would provide for an elastic tariff, giving the President discretionary authority to make it effective. The fact that the amendments have the indorsement of Commissioners Marvin and Burgess of the Tariff Commission and Judge Marion Devries, presiding justice of the United States Court of Customs Appeals, indicates that the Administration stands back of the Smoot proposal. Senator Watson of Indiana, prominent member of the finance committee, and other senators, have endorsed the amendments.

The report on the steel section of the tariff bill as it relates to the assessment of duties on the American valuation basis is expected to be submitted to the committee some time this week. It covers reports made by domestic steel manufacturers as well as data taken from the books of importers showing prices of domestic steel products and of imported steel as well as profits made by importers.

Encouraging Results of Conferences of Railroad Executives and Brotherhoods

WASHINGTON, Jan. 17.—Efforts to adjust differences between railroad executives and employees and to prevent a possible strike appear to be bearing fruit. Negotiations to this end still are in a preliminary state and it necessarily is not possible to say what the ultimate outcome may be. The conference held yesterday by Secretary of Commerce Hoover with railroad executives and representatives of the four railroad brotherhoods resulted in a provisional agreement to submit wage and working questions affecting train service employees to regional conferences for adjustments without making it necessary to take the questions up before the Railroad Labor Board.

Conferences are to take place as near Feb. 10 as practicable, according to a statement by Secretary Hoover. It was declared that the sole discussion was upon the practicability of re-establishing the pre-war regional conferences in order to facilitate the work of the Railroad Labor Board and above all to create a spirit of

working good will by adjustment instead of litigation. A meeting of the railroad executives has been called for Saturday at Chicago. Secretary Hoover said that the conference did not discuss wages and working agreements in themselves and stated that he considered the railroad labor situation as entirely disconnected from negotiations over coal mining wages.

Notice has been given formally by the railroads to the labor board and the organization of railroad employees that general reductions in existing wage schedules will be asked. The Administration is also making active efforts through negotiations with President John L. Lewis of the United Mine Workers of America to prevent trouble in the industry. The miners' union is endeavoring to prevent the reduction in wages proposed by coal operators after expiration of the existing wage contract of April 1.

No Competition Between Steel Corporation's Ships and Rail Lines

WASHINGTON, Jan. 17.—Subsidiary railroads of the United States Steel Corporation do not and may not compete with the steamship lines of the United States Steel Products Co. operating through the Panama Canal and the Interstate Commerce Commission should enter an appropriate order to this effect, according to a tentative report of Examiner Burton Fuller made public yesterday. His recommendation, if adopted, would mean reaffirmation by the commission of its holding previously made that the Steel Corporation subsidiary rail lines "do not and may not compete" with the steamship lines of the Products company operating through the canal.

The case was reopened by the commission on June 22, 1921, for further hearing in order to ascertain whether conditions with respect to competition between the applicant railroads and the steamship lines of the Products company operating through the canal had so changed since the issuance of the original report as to make the continued operation of such steamship lines by the Products company a violation of the act.

British Industries Fair

The British Industries Fair will be held at Birmingham and London Feb. 27 to Mar. 10. The centralized exhibit of British-made merchandise will be divided into two sections.

The Birmingham section will include displays of brasswork; hardware; ironmongery; metals; construction and building materials; power; lighting and heating equipment; ventilating; engineering; agriculture; mining equipment; motors; guns, etc.

The exhibits at London will embrace musical instruments; cutlery; scientific goods; photographic goods; drugs and chemicals; glassware; toys; jewelry; silverware and other manufactures.

Information regarding the fair can be obtained from the British Consulate or Trade Commissioner, 44 Whitehall Street, New York.

Dayton Malleable Iron Co. Buys Plant

The Dayton Malleable Iron Co., Dayton, Ohio, has purchased the Canton, Ohio, plant of the Timken-Detroit Axle Co., Detroit. This is a malleable iron foundry which has been used by the Detroit company for making automobile castings. It is stated that the Dayton company will operate it as a railroad specialty shop. The transfer of ownership will take place Feb. 1.

Testing Materials Meeting

The twenty-fifth annual meeting of the American Society for Testing Materials will be held on June 26 to July 1 inclusive at Atlantic City, N. J., with headquarters at Chalfonte-Haddon Hall Hotel.

OPEN PRICE COMPETITION

Plan of Knitgoods Manufacturers Expected to Provide a New Test Case

WASHINGTON, Jan. 17.—Considerable speculation exists as to the attitude of the Department of Justice toward the establishment of an "open-price" plan by the National Association of Hosiery and Underwear Manufacturers, despite the decision of the United States Supreme Court in the Memphis Hardwood case. It is expected that the establishment and actual operation of the plan will bring about a test case which, if carried to the highest tribunal, will develop an amplification of its decision in the Hardwood case. Attorneys who have followed the proceedings in the case and interpreted the decision believe that the same principle is involved in this proposed organization but expect it will have the effect of clearing up misunderstandings which have arisen as to the scope of the Supreme Court decision.

According to information received by representatives of various trade associations, the hosiery and underwear manufacturers' organization proposes to put the "open-price" plan into effect this week, and a statement issued by J. M. McCullaugh, business manager, advises that the members will file price lists in the Philadelphia headquarters where a statistician will direct the compilation of the data and forward it to each member for his own information. It is also proposed to handle production statistics in the same way. This outline of proposed activities is looked upon by some as being similar in several respects to the arrangement carried on by the members of the American Hardwood Manufacturers' Association, which the majority of the Supreme Court condemned. However, Mr. McCullaugh insists that the decision does not affect them in the least, inasmuch as there is nothing in the hosiery and underwear men's dissemination of price or production figures antagonistic to "open-price" competition. Furthermore, he declared that the data will be distributed without comment as to ways and means of increasing or decreasing production or regulating competition.

It is reported that 25 members of the Southeastern Division of the association unanimously endorsed the plan last week. It is the contention of Mr. McCullaugh that manufacturers should be able to follow the trend of the industry from an analysis of the data sent out for that purpose. He is said to have vigorously denounced any intimation that the "open-price" competition system as followed by the association is for any but an honest and fair aim.

Stack of Trumbull-Cliffs Furnace Co. Lighted

WARREN, OHIO, Jan. 17.—The new 600-ton blast furnace of the Trumbull-Cliffs Furnace Co. was placed in operation Jan. 16, in presence of officials of the Trumbull-Cliffs company and the Trumbull Steel Co. The addition of this stack to the active list brings the total number of furnaces in the Mahoning and Shenango valleys to 17 of 47, the highest number in blast since Feb. 28, 1921. The molten product of the furnace will be carried by a hot metal run across the Mahoning River to the open-hearth department of the Trumbull Steel Co. Surplus output will be diverted to the merchant trade.

Little Miss Mary Reinette Clark, daughter of Mr. and Mrs. E. F. Clark, and granddaughter of Jonathan Warner, president of the Trumbull Steel Co., and Miss Flora Mather, daughter of Mr. and Mrs. S. Livingston Mather of Cleveland, simultaneously applied torches at two different tuyeres, thus lighting the furnace. Mr. Clark is president of the Newton Steel Co., Youngstown, while Mr. Mather is secretary of the Cleveland-Cliffs Iron Co. Grouped about were the officials and employees.

Guests attended the event from Cleveland and Warren, journeying to the furnace in a special coach, and

were later entertained at lunch by Mr. Warner at his home in Youngstown, following inspection of the property.

Directors of the Trumbull-Cliffs Furnace Co. are William G. Mather, Jonathan Warner, S. L. Mather, A. N. Flora, D. T. Croxton, Philip Wick, W. H. B. Ward, Allen Hoffer, H. A. Raymond, John T. Harrington and William P. Belden. Officers are: President, W. G. Mather; vice-president, Jonathan Warner; secretary, S. L. Mather, and treasurer, C. G. Heer.

With all modern labor devices, only 100 men will be required to operate the stack.

Expanding Wheeling Steel Plant

The Wheeling Steel Corporation is actively going ahead with the construction of its new rod and wire mill at Portsmouth, Ohio, and with the extensions and betterments at its Steubenville, Ohio, works. For the latter plant, the company has just closed with the Mackintosh-Hemphill Co., Pittsburgh, for a 35-in. blooming mill, which is to be driven by a four-cylinder Nordberg uniflow reversing engine, this constituting the first attempt in this country to drive a blooming mill with this type of engine. The manipulator for this mill also will be furnished by the Mackintosh-Hemphill Co., which will install one of its newest patented manipulators. The Wheeling Mold & Foundry Co. has been awarded the tables and transfers while the Morgan Construction Co., Worcester, Mass., will furnish one 750-ton and one 900-ton steam hydraulic shears and a 3-cylinder upset shears. This company some time ago was awarded the contract for a continuous mill for this works. It is probable that the company will close on the cranes for this plant soon. Buildings to house the new rod and wire mill at Portsmouth will be fabricated and erected by the McClintic-Marshall Co., Pittsburgh. The company also is figuring on a new boiler plant at Steubenville, Ohio, to furnish power for the uniflow engines, the boilers to be 250-lb. pressure and to be superheated. It also will install turbo-generators which will make the company independent of outside sources for electric power.

Bank Takes Over Cromwell Steel Co.

The Guardian Savings & Trust Co., Cleveland, has taken over the plant of the Cromwell Steel Co., Lorain, Ohio, and has placed a custodian in charge. This action was taken to prevent receivership and bankruptcy proceedings and follows a recent adjustment agreement to which committees of bondholders, creditors and stockholders, the Cromwell company and the bank are parties. The obligations of the company include \$2,000,000 in bonds on which interest has been defaulted, and approximately \$1,000,000 in notes and accounts. About \$1,250,000 in bonds, stocks and other claims have been deposited with the bank under the terms of the adjustment agreement. The bank is trying to find a purchaser for the plant.

COMING MEETINGS

January

Engineering Institute of Canada. Jan. 24 and 25. Annual meeting at Montreal. J. L. Busfield, secretary-treasurer Montreal branch, 280 St. James Street, Montreal.

February

American Boiler Manufacturers' Association. Feb. 13. One-day winter meeting. Fort Pitt Hotel, Pittsburgh. Secretary, H. N. Covell, 191 Dikeman Street, Brooklyn, N. Y.

American Institute of Mining and Metallurgical Engineers. Feb. 20-25. Spring meeting. Engineering Societies Building, New York. Secretary, Frederick F. Sharpless, 29 West Thirty-ninth Street, New York.

New Forcing and Bending Press

A press designed for operations involving forcing, pressing and bending, and adaptable more especially to railroad and other large shops, has been placed on the market by the Watson-Stillman Co., New York. It not only provides the means for rapid and convenient pressing in and out of driving box brasses, pressing gears on and off, etc., but because of its wide bed it can be used also for many operations of bending and straightening.

The press is of the reversed cylinder type having the ram movement from the top downward. The pump

is required only for the pressure application, the hand-wheel shown in the illustration being provided for bringing the ram quickly to and from the work. The latter feature thus eliminates waiting for the pump to move the ram through the idle part of the stroke.

The bottom platen is amply strong for bending with bending blocks on its ends under the full capacity of the press. The "U" piece is hinged to one of the columns of the press which enables it to be swung to the center, as shown, or to one side and out of the way. The jib crane is provided with a trolley which, equipped with a chain hoist, is used in handling the work in and out of the press. The hole in the bottom platen is

The Capacity is 75 Tons and the Ram Movement 21 In. The bottom platen is 72 in. long

for receiving shafts and pressing gears and other work.

The drive is either by belt through tight and loose pulleys or by directly attached constant speed motor as shown. The gage indicates the pressure on the ram in pounds per square inch, and the total pressure in tons. The pump is a two-plunger type and the entire control of the press is through a single screw stem valve. The top and bottom platen cylinder and crane bracket are open-hearth steel castings, and the ram and rods of machinery steel. The cylinder is copper-lined.

Improvement in Shipbuilding Predicted

A combination of developments in the shipbuilding industry that have forged to the front within recent months have given rise to considerable optimism and have served to brighten the outlook for the ensuing year, says Clarence Samuel King, secretary of the Atlantic Coast Shipbuilders' Association, in an article published in the current issue of the Association Bulletin.

"Exclusive of large repair contracts and port development plans recently projected," says Mr. King, "new vessel construction bids for which have not yet been opened but which are definitely contemplated, are reported to aggregate an expenditure of approximately \$10,000,000."

Mr. King states that although 1921 was a lean year for shipbuilders it should not be overlooked that all major industries have suffered proportionately, and while there is little pleasure in suffering even in good company it is gratifying to note that the dearth of shipbuilding contracts has been due to a general recession in world trade and not to faults in the industry.

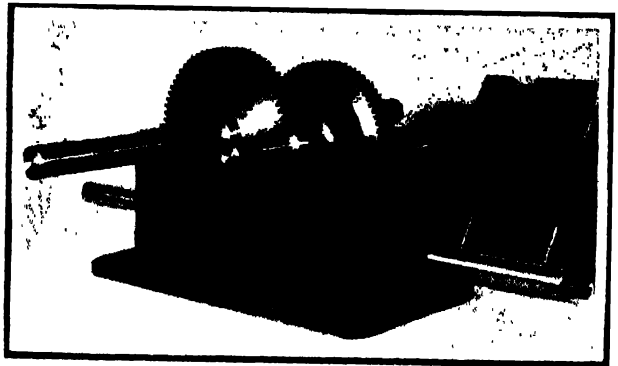
"Busy times are just around the corner," says Mr.

King, and to justify his optimistic forecast reference is made to the idle ships now in our ports which will need much repairing before being placed in service. He also points out that we are greatly in need of fast passenger ships to balance our fleet of cargo carriers.

Worm and Spur Gear Speed Transformer

A combined worm and spur gear speed transformer of the type shown in the illustration has been placed on the market by the Natisch Gear Works, 451 Hudson Avenue, Brooklyn, N. Y. It is made in various ratios between 1 to 75 and 1 to 1000, and for transmitting up to 5 hp.

The design is similar in all sizes, the same case being used for many different ratios. The change is accomplished by varying the number of teeth in the spur gears and also by changing the pitch and number



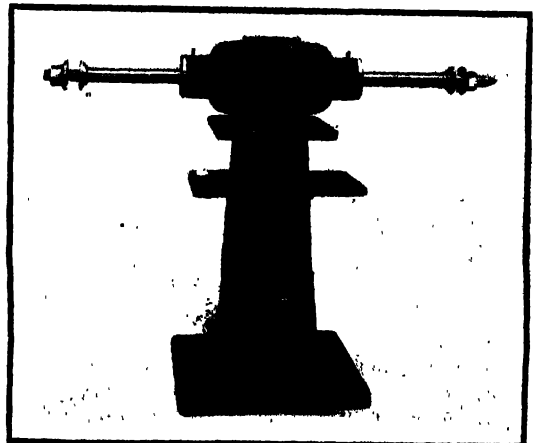
Combined Worm and Spur Gear Speed Transformer

of teeth in the worm gear. The case is of cast iron, ruggedly built and is oil tight and dust proof. The illustration shows a drive arranged for a ratio of 1 to 600, to transmit $\frac{1}{2}$ hp.

New Line of Motor-Driven Buffing Machines

A line of alternating current motor buffing machines, built in four sizes from $\frac{1}{2}$ hp. for wheels 6 x $\frac{1}{2}$ in. to 3 hp. for wheels 12 x 2 in., has been placed on the market by the J. G. Blount Co., Everett, Mass.

Among the salient features are S. K. F. ball bearings in dust proof housings, spindles of high carbon



Spindles Are of High Carbon Steel Ground to Size

steel ground to size, large tool tray bolted to the column, snap switch having thermal cut-outs for motor protection, and a taper point fitted to right-hand end of spindle for small wheels.

The head or motor unit is regularly mounted with pan on the column, but may be mounted on a bench base if preferred. All parts bolting together are planed or milled to insure proper contact. The safety snap switch is mounted on the column beneath the tool tray, an arrangement intended to protect it from the buffing compounds used, and also from breakage. The motors are of the Westinghouse design. The machines are finished with an oil proof enamel, which permits keeping them looking good by wiping off occasionally.

Shippers Will Strongly Urge Lower Rates

Railroad Executives Heard and Will Be Followed by Representatives of Iron and Steel and Other Industries
Before the Interstate Commerce Commission

BY L. W. MOFFETT

WASHINGTON, Jan. 17.—Testimony of railroad executives before the Interstate Commerce Commission in its rate investigation will be concluded to-morrow, after which the shippers' side will be presented. On Thursday and Friday of the present week, the rate situation as it applies to coal and coke will be submitted, while on Saturday and Monday representatives of the iron and steel industry will present their case, discussing rates with relation to ore, furnace materials, iron and steel products, etc. Iron and steel manufacturers, as well as producers in all other lines, are demanding lower rates, but naturally are concerned over the labor situation. Railroad executives have repeatedly told the commission that lower costs are necessary before a general reduction can be made. President Daniel Willard of the Baltimore & Ohio Railroad said that rates will eventually come down, but to hasten the movement would be unwise and would not tend to promote the public interest. It has been pointed out that net operating revenues of railroads for November, the latest statistics available, were at the rate of 3.8 per cent handled on the value of railroad properties, while the transportation act provides that the commission shall fix rates which will enable the railroads to earn 6 per cent of their valuation.

"High as railroad charges are, they are not higher relatively than other prices are or were, and it is important to remember that railroad charges or prices were the very last to go up and in the nature of things cannot be the first to come down," Mr. Willard told the commission. "They can and will participate in the downward movement of all other prices."

Forced Economies

Mr. Willard said that the financial results already obtained by the railroads have been accomplished "only by forced economies that are neither in the public interest nor can they be indefinitely continued."

He pointed out that rate adjustments already have been made to correct disarrangements as to localities and some dislocations as to commodities, and in a few instances adjustments have been made for purely economic reasons, as in the case of certain export rates revised in an effort to stimulate competition in world markets, and more recently with reference to agricultural products which perhaps have more widely and more completely been forced downward to a pre-war basis. Rates having generally been advanced on a uniform or percentage basis, he said, it would seem desirable, in fact, necessary, that when general reductions are made, they should be made in the same way.

President R. H. Aishton, of the American Railway Association, described the organization and work of that association, which, through its various committees and divisions, constantly makes studies of improved methods and practices for the benefit of all the railroads. He showed that the railroads had reduced their fuel consumption per train mile and per ton mile and excluding bad order and surplus freight cars, he showed the average miles per freight car per day had increased in 1921 and the average train speed had increased from 10.3 to 11.6 miles per hour.

Needs of Railroads

Other railroad representatives testified that on the basis of the present volume of business \$791,905,811 would be needed in 1922 by the railroads of the country in order to keep abreast of the present needs of the nation, while \$633,043,244, additional would be required in 1922, to be spent in order to handle adequately the volume of traffic under normal conditions.

H. E. Byram, of Chicago, president of the Chicago,

Milwaukee & St. Paul railroad, and others, asserted that while some relief has already been provided the carriers through the action of the Railroad Labor Board in reducing wages, it is inadequate to enable any further reduction in wages at this time. Mr. Byram said that while immense opportunities are available for further increasing economy of operation by large investments in reducing grades, double track, improving and increasing terminal facilities, etc., these improvements cannot be made because they would require the investment of large sums of new capital which cannot be obtained unless the earnings of the railroads are such as to satisfy investors that such investments in railroad securities would be safe and productive.

Continuing, Mr. Byram said that it would seem that the need of the immediate situation requires a reduction in operating costs. Fuel and labor, which absorb 80 per cent of the total operating cost, must bear the larger portion of the reduction. Fuel and other supplies already are coming down and the United States Railroad Labor Board decision decreased his company's payroll almost 11 per cent, or about \$770,000 per month, effective last July.

Editor Dunn Testifies

Samuel O. Dunn, of Chicago, editor of the *Railway Age*, testified that because of a progressive decline in railway development in the United States as measured by miles of line and cars and locomotives ordered and built in recent years, the carriers, owing to lack of revenues, have been unable to keep abreast of the growth in other industries. If this continues, he said, the country will be brought face to face with a serious situation where the railroads will be unable to handle the traffic unless by increased earnings they are enabled to obtain increased facilities.

This decline, Mr. Dunn showed, has been accentuated since the war and by 1920 there was an actual reduction in the mileage and in the number of locomotives and freight and passenger cars in service, but the decline in the annual rate of increase had begun long before the war.

In each of the last five years the mileage of railroad line abandoned in the United States has exceeded the mileage of new line built, Mr. Dunn said, and in 1921 the mileage of new lines and the cars and locomotives ordered were less than in almost any previous year in railway history. The new railroad mileage built in 1921 was 475 miles, or less than has been reported in any previous year except in 1920, when only 314 miles were built.

For the five years 1917 to 1921, inclusive, the mileage of railroad abandoned in the United States has totalled 4,989 miles, the witness said. The number of locomotives in service on the railways of the United States increased 7,378 in the four years ended with 1913, Mr. Dunn said, but only 473 in the four years ended with 1917 and 617 in the four years ended with 1920. The number built for service in the United States and Canada in 1921 was 1,185, or less than the number built for the United States alone in any year since 1897.

As to freight cars, the number built in 1921, according to Mr. Dunn, was only 40,292, which is the smallest number ever reported since the *Railway Age* began to compile the statistics in 1899. In 1906 and 1907 alone, Mr. Dunn said, the number built was 516,667. The number of passenger cars built in 1921 for use in the United States was 1,275, the smallest number ever reported except in 1920 and 1919, and the number of new passenger cars ordered during the year was only 246.

Iron and Steel Markets

LIGHTER OPERATIONS

Some Price Concessions on Heavier Products

Tin Plate Output Well Maintained—Export Orders for Plates, Sheets and Pipe

The common expectation of activity in the early spring is more of an influence in the steel market than anything buyers have done since the year opened. Operation of steel works has fallen off slightly. In the case of the Steel Corporation it has been not far from 40 per cent in the past week, while 30 per cent is not uncommon with independent companies. Pittsburgh reports some buying of lighter products that go into consumption through jobbers.

It is recognized that replenishment demand still must be counted on for alternating improvement in mill schedules, since manufacturing consumers of steel as a rule have no definite plans for increased production in the immediate future. Steel companies are more sanguine of a higher rate of output in the next few months than of a turn for the better in prices.

In new railroad demand the inquiry of the Southern Railway for 26,600 tons of 85-lb. and 8500 tons of 100-lb. rails is the chief new item, and there is an order from the Grand Trunk for 9500 tons of 100-lb. rails for its American lines. Chicago mills are counting on 65,000 tons of steel for the cars placed last week; and 5000 tons more will be needed for 500 cars the Central of Georgia is about to order.

Prices of the principal forms of finished steel are still sagging, though there are producers who have declined business because they would not add \$1 or \$2 per ton to the losses they have been making lately. While 1.50c. is a common line of resistance on bars and structural shapes, a 1.40c. price on steel plates is not as rare as it was.

The New York-New Jersey tunnel will require 10,000 tons of plates and makers of bolts will be in close competition for the 45,000 kegs that will be needed.

A \$1 reduction in bar iron by Eastern makers brings that product to 1.45c., Pittsburgh. In the Middle West, hard steel reinforcing bars have sold down to 1.40c. Some irregularity has developed in wire products and in the past week \$2.40 has been done on wire nails, or 10c. per keg below the price last announced.

Sheet mill output in Pittsburgh and outlying districts is on a 75 per cent basis for Steel Corporation and 50 per cent for independent plants. Tin plate mills for some weeks have run at a high rate and are likely to hold to it through the winter. This will be a good year for tin plate.

The Port Arthur (Ont.) Shipbuilding Co. has placed 4000 tons of plates for a lake boat for Canadian account. Lake shipyards are figuring on one or two ore vessels.

December business in fabricated steel work amounted to 71,500 tons against about 99,000 tons

in each of the two previous months. Of the 758,000 tons contracted for in 1921, 47 per cent developed in the last four months.

Many foundries are planning to bid on the segments for the New York-New Jersey vehicular tunnel, which will require over 100,000 tons of pig iron, but the largest tonnage inquired for by any foundry is 50,000, to be delivered over a period of 20 months at the rate of 2500 tons per month. Owing to the long period of delivery, furnaces are very slow to sell and their policy has not yet been definitely determined. Southern pig iron has again receded 50c. to \$16. In the North there is very little activity, but prices are fairly well maintained. A western Pennsylvania steel company has appeared in the market as a seller of foundry iron.

An interesting item in the export trade is the sale of 5000 tons of plates for a Melbourne, Australia, water pipe line. England was a close competitor. Japan has bought here 2000 tons of large pipe for a high pressure line, and at Chicago an independent mill has a 3000-ton sheet order from Japan.

Brazil, India, China and Japan figure in current tin plate buying. From South Africa as well as South America considerable inquiry is now before export steel companies.

Drastic price cuts in England, in both pig iron and steel items, have resulted in virtually stopping Continental competition. Sheets and tin plates are weaker, production exceeding demand.

THE IRON AGE composite price for pig iron is at last back again at the low point of \$18.52 which it touched in August last.

Pittsburgh

PITTSBURGH, Jan. 17.

Completion of inventories is beginning to find reflection in a slightly better demand for a number of steel products, notably in the lighter materials which usually pass into consumptive channels through jobbing and warehouse interests. Another important development of the past week has been increased steadiness in prices. The effort to stimulate business by cutting prices and also by attempting advances over what had previously been done, as in the case of sheets, having failed, the trade now is inclined to make something of a stand on the basis of quotations of the last few weeks. The heavy tonnage products are more confidently quoted at 1.50c. base, Pittsburgh, than was the case recently, and on bars and structural shapes the claim is made that some business has been entered as high as 1.60c. There continues to be some doubt as to the real basis of plates, makers asserting that 1.50c. is minimum, while buyers are equally firm in their insistence that 1.40c. can be done on real orders. Buyers of the heavier lines are placing the business at the lowest delivered price and this condition localizes strictly the business of the mills in the different centers. Irregularity still marks both the demand and prices for wire products, but efforts to depress the sheet prices established late last November have been unsuccessful and it is noted that blue annealed sheets in the heavier gages now are fully up in price to the lighter gages. Demand in general characteristics is much as it has been during the past

A Comparison of Prices.

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:					Sheets, Nails and Wire, Per Lb. to Large Buyers:				
	Jan. 17, 1922	Jan. 10, 1922	Dec. 20, 1921	Jan. 18, 1921		Jan. 17, 1922	Jan. 10, 1922	Dec. 20, 1921	Jan. 18, 1921
No. 2X, Philadelphia...	\$21.34	\$21.34	\$21.34	\$33.25	Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.35
No. 2, Valley furnace...	19.50	19.50	19.50	31.50	Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.70
No. 2, Southern, Cin't...	20.60	21.00	21.50	36.50	Sheets, blue an't'd, 9 & 10	2.25	2.25	2.25	3.55
No. 2, Birmingham, Ala...	16.00	16.50	17.50	32.00	Wire nails, Pittsburgh...	2.50	2.50	2.75	3.25
No. 2 foundry, Chicago*	19.00	19.00	19.50	31.00	Plain wire, Pittsburgh...	2.25	2.25	2.50	3.25
Basic, del'd, eastern Pa...	20.25	20.25	20.25	33.86	Barbed wire, galv., P'gh...	3.15	3.15	3.40	4.10
Basic, Valley furnace...	18.25	18.25	18.25	30.00	Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$7.00
Bessemer, Pittsburgh...	21.46	21.46	21.96	33.96	Old Material, Per Gross Ton:				
Malleable, Chicago*	19.00	19.00	19.50	31.50	Carwheels, Chicago...	\$15.50	\$15.50	\$15.50	\$21.00
Malleable, Valley...	19.50	19.50	20.00	32.00	Carwheels, Philadelphia...	16.50	16.50	16.50	25.00
Gray forge, Pittsburgh...	20.96	20.96	20.96	32.46	Heavy steel scrap, P'gh...	14.50	14.50	14.50	16.00
L. S. charcoal, Chicago...	31.50	31.50	31.50	40.50	Heavy steel scrap, Phila...	11.50	11.50	11.50	14.50
Ferromanganese, del'd...	60.00	60.00	60.00	100.00	Heavy steel scrap, Ch'go...	11.50	11.50	11.00	15.00
Rails, Billets, etc., Per Gross Ton:					No. 1 cast, Pittsburgh...	10.50	10.25	10.00	25.00
O.-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00	No. 1 cast, Philadelphia...	16.50	16.50	16.50	24.50
Bess. billets, Pittsburgh...	28.00	28.00	28.00	43.50	No. 1 cast, Ch'go (net ton)	13.00	13.00	12.50	17.00
O.-h. billets, Pittsburgh...	28.00	28.00	28.00	43.50	No. 1 R.R. wrot, Phila...	14.50	14.50	14.50	20.00
O.-h. sheet bars, P'gh...	29.00	29.00	30.00	47.00	No. 1 R.R. wrot, Ch'go (net)	10.50	10.50	10.50	13.50
Forging billets, base, P'gh...	32.00	32.00	32.00	48.50	Coke, Connellsville, Per Net Ton at Oven:				
O.-h. billets, Phila...	33.74	33.74	33.74	49.24	Furnace coke, prompt...	\$2.75	\$2.75	\$2.75	\$5.00
Wire rods, Pittsburgh...	36.00	36.00	35.00	57.00	Foundry coke, prompt...	3.75	3.75	3.75	6.50
Skelp, gr. steel, P'gh. lb...	1.50	1.50	1.50	2.45	Metals,				
Light rails at mill...	1.50	1.50	1.55	3.00	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Finished Iron and Steel,					Lake copper, New York...	13.87½	13.87½	13.87½	13.25
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents	Electrolytic copper, refinery	13.62½	13.62½	13.62½	13.00
Iron bars, Philadelphia...	1.87	1.85	1.85	2.70	Zinc, St. Louis...	4.77½	4.77½	4.90	5.55
Iron bars, Chicago...	1.60	1.60	1.60	2.68	Zinc, New York...	5.12½	5.12½	5.25	6.00
Steel bars, Pittsburgh...	1.50	1.50	1.50	2.35	Lead, St. Louis...	4.40	4.40	4.40	4.90
Steel bars, Chicago...	1.60	1.60	1.60	2.73	Lead, New York...	4.70	4.70	4.70	5.12½
Steel bars, New York...	1.88	1.88	1.88	2.73	Tin (Strait), New York...	32.00	32.12½	33.00	34.75
Tank plates, Pittsburgh...	1.50	1.50	1.50	2.65	Antimony (Asiatic), N. Y.	4.45	4.50	4.50	5.15
Tank plates, Chicago...	1.60	1.60	1.60	3.03					
Tank plates, New York...	1.83	1.83	1.83	3.03					
Hams, Pittsburgh...	1.50	1.50	1.50	2.46					
Hams, Chicago...	1.60	1.60	1.60	2.83					
Hams, New York...	1.88	1.88	1.88	2.83					
Steel hoops, Pittsburgh...	2.00	2.00	2.00	3.05					

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 17, 1922, Finished Steel, 2.062c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Jan. 10, 1922, 2.062c. Dec. 20, 1921, 2.098c. Jan. 18, 1921, 3.057c. 10-year pre-war average, 1.684c.
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Composite Price, Jan. 17, 1922, Pig Iron, \$18.52 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Jan. 10, 1922, \$18.60 Dec. 20, 1921, 18.86 Jan. 18, 1921, 31.04 10-year pre-war average, 15.72
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few weeks. Buyers are covering only their most pressing needs and insisting on prompt delivery. The gain in business has been in the number of orders rather than in the size, and the mills still have difficulty in building up back logs.

Plant operations in this district do not change much as far as the steel works are concerned but finishing mill operations show some expansion, notably in sheets. The independents are now averaging close to 50 per cent and the Steel Corporation sheet subsidiaries about 75 per cent. Strip mill activities also are somewhat heavier than they were recently. Tin plate mills, which for several weeks have been running at a high rate, show no signs of an immediate let down.

Entrance of the Cambria Steel Co. into the market as a maker of foundry iron is a feature of an otherwise uninteresting situation in pig iron. This company is reported to have taken some business in and around Johnstown on a basis of \$19.50 furnace for No. 2. This means a further restriction in the territory of furnaces which previously had served Johnstown melters of foundry grade. The scrap market remains firm in the face of only a moderate demand from the steel makers. The situation in coke and coal is without new features.

Pig Iron.—This market again has become extremely dull, the only important sale of the past week being

500 tons of basic to a Pittsburgh district sheet maker at about \$18.25, at Valley furnace. Information about this sale is limited, but the common impression is that the iron was sold by a furnace with a lower freight rate to point of consumption than Valley furnaces. Follanslee Bros. Co. again is seeking 1000 tons of basic for prompt delivery. Nothing lately has been done in Bessemer or malleable iron and interest in foundry grade centers about an inquiry for 3000 tons by the Oil Well Supply Co. of iron of 1.60 to 2 per cent in silicon, 0.05 and under in sulphur and 0.40 to 0.70 in phosphorus and manganese. Some makers have quoted \$19.50 Valley furnace against this inquiry, and others \$19, but the company claims to have had a quotation of \$18.50. The tonnage, which is for delivery during the remainder of this quarter, is expected to be placed in a day or two.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$18.25
Bessemer	19.50
Gray forge	19.00
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	19.50

Ferroalloys.—Inquiries are somewhat more numerous than they were recently, but as yet there has been no corresponding gain in actual sales. Apparently the enlarged interest of consumers is created by fears

about the new tariff rather than by actual needs, as most of them are running at a low rate and have fair-sized stocks on hand or under contract. Prices do not change much. The latest business in 50 per cent ferro-silicon was 100 tons to a Pittsburgh foundry interest on the basis of \$55 delivered. This price about measures the market, despite the efforts on the part of producers to obtain \$60 or more. The market on spiegeleisen shows a firmer tendency, the result of the fact that production for several months past has been practically nil, and there has been a sufficient demand to materially reduce makers' stocks. Practically no 20 per cent material now is available and that of lower manganese content is not plenty. The former grade is nominally quotable at \$26, furnace, or \$30 to \$32 delivered this immediate territory, and 16 to 19 per cent at \$25, furnace. Hardly enough has been done recently in ferromanganese to establish any change in prices.

We quote 78 to 82 per cent domestic ferromanganese at \$59 to \$63.67 delivered; 78 to 82 per cent foreign ferromanganese, \$58.35, c.i.f. Atlantic seaboard; German, for 76 to 80 per cent, \$54, seaboard. Average 20 per cent spiegeleisen at \$30 to \$32 delivered, Pittsburgh or Valleys; 16 to 19 per cent spiegeleisen, \$28 to \$30 delivered Pittsburgh; 50 per cent ferro-silicon, domestic, \$54 to \$57, freight allowed. Bessemer ferro-silicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.80; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 6 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—So little is going on as to make impossible anything more than an appraisal of prices. A number of makers of sheet bars, who during the latter part of December entered contracts for January and first quarter delivery report specifications from sheet makers to be extremely difficult to obtain. Makers of tin plate, however, are specifying fairly freely. Interest in billets and slabs still is extremely small. There has been some increase in open-hearth and Bessemer furnace operations in the Valley district, but here in Wheeling no appreciable change is noted.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$29, 2 x 2 in. billets, \$29 to \$30, Bessemer and open-hearth sheet bars, \$30, slabs, \$29 to \$30, forging billets, ordinary carbons \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Export demands to a considerable extent counterbalance a lack of demand of the usual proportions from domestic consumers, and makers in this district are doing a relatively good business. The base price ranges from \$36 to \$38, Pittsburgh or Youngstown, depending upon the origin and size of the order. Prices are given on page 247.

Steel Skelp.—Interest in this material is not especially large and the quotation of 1.50c. Pittsburgh, for steel pipe skelp is nominal and untested.

Steel Rails.—The railroads still are moving cautiously in the matter of specifications on standard rail orders, and this is reflected in rather light operations of the rail mills. It is evidently not the intention of makers to build up stocks in anticipation of future releases, as such a course proved pretty costly last year. Interest in light rails is limited and prices are easy. These sections rolled from new steel now are offered at 1.55c. by leading makers and actually have been sold at 1.50c.

We quote 25 to 45-lb. sections rolled from new steel, 1.55c. base, rolled from old rails, 1.45c. to 1.50c. base, standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—The most interesting development of the past week in steel bars is a firmer stand by makers on a base of 1.50c. and an effort which has been successful in part to obtain \$1 or \$2 per ton more for small lots. Sizable lots can be placed at 1.50c., but bids of less are not getting much consideration. Makers of refined iron bars still are quoting them at 2.15c., base, but with common iron bars available at 1.85c. delivered from Eastern mills, it is rather difficult for local makers to obtain quotations.

We quote steel bars rolled from billets at 1.50c. to 1.60c.; reinforcing bars, rolled from billets, 1.50c. to 1.60c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—One important maker here reports the past week to have been the best in the matter of orders and specifications since early last fall, the betterment being ascribed by this interest to its firm refusal to consider less than \$2.50 base per keg for bright nails, \$2.25 base per 100-lb. for plain wire and \$2 base per count keg for cement coated nails. Other makers have experienced no appreciable gain in business due to the fact, they say, that there is so much talk of concessions that their customers are inclined to move slowly in the matter of purchases. There has been no public announcement of any reduction from the Dec. 21 prices, but there are well authenticated instances of manufacturers asking buyers to come back if they are quoted less than the recognized market quotation.

We quote wire nails at \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Sheets.—The leading interest reports the past week to have been the best both as far as shipments and mill operations that it has had in the past few months. It enjoyed an average operation for the week of slightly more than 75 per cent of capacity. Independents also have had some increase in business, current orders being at the rate of about 50 per cent of normal production. The feature of the market is the continued firm adherence on the part of all makers to 3c. base, Pittsburgh, for black sheets, and 4c. base Pittsburgh for galvanized. An interesting development is that the market lately has been growing stronger on blue annealed sheets which have sold at 2.25c. base for the heavy, as well as the light, gages. There are reports from the East, notably from Philadelphia, that concessions of as much as \$5 per ton have been made on galvanized sheets, but verification is lacking and the reduced prices are believed to refer to some liquidating sales by jobbing interests. Prices are given on page 247.

Tin Plate.—The market continues satisfactory in that container manufacturers are specifying against contracts freely and there is a continued high rate of operation of mills in this and nearby districts. The leading interest last week operated close to 90 per cent of capacity and independent operations ran almost as high despite the fact that a few of them still were idle. Less disposition to make prices attractive is noted and only the large consumers, who usually have preferential price treatment, now are able to buy production plate much under \$4.75 per base box.

We quote standard production coke tin plate at \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—Some makers of cold-rolled and cold-drawn screw stock and shafting detect a slightly better inquiry and also a somewhat firmer tendency of prices, which is manifest in the reappearance in a number of centers of the usual price differential for less than carload tonnages. For the larger lots there are fewer instances than recently of a willingness on the part of makers to accept less than 2c. base Pittsburgh. The Cumberland Steel Co. effective Jan. 13, made a reduction of \$5 per ton in ground shafting to \$2.25 per 100-lb. base for carloads and \$2.50 per 100-lb. base for less than carloads, with the usual extras, f.o.b. cars, Cumberland, Md.

Hoops and Bands.—Cooperage material still is firmly held at 2c. base, Pittsburgh, but on the heavier gages the market is quotable from 1.75c. to 2c. In the latter, competition for business is sharp because there are so many manufacturers who have facilities for rolling what is classified as band steel. Some of them are using the old bar card in making prices.

Hot-rolled and Cold-rolled Strips.—Now that jobbers and consumers have practically completed their inventories and know where they stand, manufacturers of strips are beginning to get more orders and also specifications against old business. Demand, however, is good only by comparison with the extremely limited buying of the past two weeks. There is no special change in prices, cold-rolled strips holding fairly well

at 2.50c. base Pittsburgh, while hot-rolled strips are 2c. base Pittsburgh, for carload lots, with some concessions being made to quantity buyers.

Nuts and Bolts.—Makers in this district still report no occasion for satisfaction over the amount of business coming in. Both consumers and jobbers are going along with rather light stocks, but despite that fact they are inclined to make frequent small purchases rather than enter their requirements for a period of a month or longer. Discounts are given on page 247.

Rivets.—There has been no appreciable improvement in business, but it is expected that with the completion of inventories, consumers and distributors will find themselves in need of supplies at least to round out their stocks, and the next few weeks are expected to see some increase in orders. No change is noted in prices or discounts, which are to be found on page 247.

The market still leans in buyer's favor. On large lots of standard spikes as low as \$2.15 base per 100-lb. lately has been done. That was the base on 11,700 kegs for the Louisville & Nashville railroad, taken by a Pittsburgh maker. The Missouri Pacific Railroad has closed for 1000 kegs with a Western maker. The Southern Pacific Co. inquiry for 2000 kegs still is open. The maximum on carload lots of standard spikes now is \$2.20 base and small spikes also are down about \$1 from recent quotations. New prices are given on page 247.

Structural Material.—Makers are inclined to take a firmer stand on prices, although both sales and inquiries are few and small. Fabricating shops in this district are figuring upon a fair number of inquiries, but most of the projects are outside this immediate district. Mills here are holding pretty firmly to 1.50c. as a minimum, and are encouraged in this attitude by the news that a large Eastern mill recently quoted 1.50c. to 1.60c. against a structural steel inquiry of the New York Central Lines. Prices are given on page 247.

Plates.—The market is such a limited affair as regards demand and sales that prices are not at all well defined. Makers insist that 1.50c. is minimum, but buyers claim that if they had orders to place they would not have to go above 1.40c. or 1.45c. Not much business recently has been taken by tank or barge builders and the car shops are getting close to the end of their railroad repair orders.

We quote sheared plates, $\frac{1}{4}$ in. and heavier tank quality at 1.50c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Makers of both steel and wrought iron pipe are having a fair run of orders in merchant pipe, but note no abandonment on the part of buyers of a policy of meeting only their actual requirements. Not much is going on in oil well or line pipe, due to fears of lower oil prices in other fields following the recent reductions in Pennsylvania crude oil. Booth & Flinn, Ltd., have put out an inquiry for 400 tons of 3, 4, 6, 8 and 12-in. pipe for the new vehicular tunnel in New York. Prices are holding fairly well in all lines, although there are intimations that a sizable order for line pipe might occasion some sharpening of pencils. Discounts are given on page 247.

Boiler Tubes.—Demand in both steel and iron tubes is purely hand to mouth, and while orders are coming along steadily, few of them are for sizable lots. Prices are rather easy, especially on seamless steel tubes, which are selling at prices well under cost. The railroads are making occasional purchases of the latter. Discounts are given on page 247.

Coke and Coal.—There is only a limited market for spot tonnages of furnace coke and efforts to bring prices more in line with those for contracts have not yet been especially successful. Operators with tonnages available for immediate delivery generally are asking \$3 per net ton, oven, but consumers still claim ability to secure supplies anywhere from 10c. to 25c. below that price. Spot foundry coke holds at \$3.75 to \$4.25. The coal market remains dull and weak on spot tonnages. Non-union mine run steam coal recently sold as low as \$1.85 and \$1.50 has become the maximum

figure. Non-union by-product coal, mine run grade, is selling anywhere from \$1.50 to \$1.75. Gas coal, coming entirely out of union districts, is quotable from \$2 to \$2.35 for run of mine.

Old Material.—The market exhibits a very firm tone, notwithstanding that the demand from the steel companies still is light. This outwardly finds its chief explanation in the fact that dealers still have some short contracts to cover and are easily frightened into paying rather stiff prices by the fact that open market offerings are moderate. The steel foundries lately have been taking on tonnages with some freedom and their purchases have contributed to the firmness of the market on the better grades of railroad steel. There is sufficient demand to keep the market clear of the lighter grades of open hearth material, prices of which are well maintained.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$14.50 to \$15.00
No. 1 cast, cupola size.....	16.50 to 17.00
Revolving rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	15.50 to 16.00
Compressed sheet steel.....	11.75 to 12.00
Bundled sheets, sides and ends.....	10.50 to 11.00
Railroad knuckles and couplers.....	15.50 to 16.00
Railroad coil and leaf springs.....	15.50 to 16.00
Low phosphorus standard bloom and billet ends.....	17.50 to 18.00
Low phosphorus plates and other grades.....	17.00 to 17.50
Railroad malleable.....	12.50 to 13.00
Iron car axles.....	23.00 to 24.00
Locomotive axles, steel.....	21.00 to 22.00
Steel car axles.....	15.50 to 16.00
Cast iron wheels.....	15.00 to 15.50
Rolled steel wheels.....	15.50 to 16.00
Machine shop turnings.....	9.50 to 10.00
Sheet bar crop ends.....	14.50 to 15.00
Heavy steel axle turnings.....	11.50 to 12.00
Short shoveling turnings.....	10.75 to 11.00
Heavy breakable cast.....	14.25 to 14.75
Stove plate.....	13.00 to 13.50
Cast iron borings.....	10.75 to 11.00
No. 1 railroad wrought.....	11.50 to 12.00

Poor Year's Business in Fabricated Steel

The records of the Bridge Builders and Structural Society, from reports collected by its secretary, George E. Gifford, 50 Church Street, New York, show that in December 71,500 tons of fabricated steel was contracted for throughout the United States. This is roughly equivalent to 40 per cent of the capacity of the bridge and structural shops of the country, put at 180,000 tons per month.

The total fabricated steel business for 1921 appears thus to be 758,000 tons or 35 per cent of annual capacity. This exceedingly low performance of slightly over 63,000 tons per month compares with about 90,000 tons per month in the two poor years of 1913 and 1914 and with nearly 105,000 tons per month for the nine years of 1912 to 1920 inclusive. Whereas normally the tenth year of the decade should, other things being equal, show a large total, as a mark of the expansion of the country, the 1921 volume is in fact only 70 per cent of either of the two poorest years for which records are available. The foregoing recapitulation is merely another commentary on a year which furnishes many records for low production.

Buffalo Iron and Steel Makers Complain

WASHINGTON, Jan. 17.—Formal complaint for filing with the Interstate Commerce Commission has been prepared by counsel representing iron and steel makers in the Buffalo district charging that they are unduly discriminated against in rates on iron ore, coal and coke which they have to pay in favor of interior competitors by reason of rates the latter pay on ore. The complaint puts in formal shape charges which have been informally made previously, resulting in a hearing before members of the commission and the ordering by the commission of the restoration of the old rates on ore, effective Jan. 11 from Lake Erie ports to interior furnaces.

Chicago

CHICAGO, Jan. 17.

The market is exceptionally quiet in all departments. A slight improvement in the wire trade is noted, and a fair amount of soft steel bar business is coming from miscellaneous sources, while sheets, though firm, are inactive so far as the domestic market is concerned. Further tonnage is being booked from abroad, however, the local independents having taken orders for 3000 tons of sheets from Japan within the past week. It will take some time for the specifications to be prepared for the steel required for the cars recently placed by the railroads, but local mills expect to book 65,000 tons for that work. Other car orders are looked for soon, the largest among them being 7300 cars which will be bought by the Burlington.

In the building construction field the largest inquiry which has come out for many weeks is one calling for 15,000 to 20,000 tons for the head-house and concourse of the Chicago Union Station. This project, which has undergone numerous delays since its inception, is now scheduled to reach completion within two years.

Although the local building trades council failed to call a strike a week ago, an insurgent movement has sprung up in the union ranks which threatens to tie up all construction jobs on which non-union labor is employed. Of broader significance is the threatened strike of bituminous coal miners, scheduled for April 1. With labor troubles in the coal, building and railroad industries still demanding settlement, progress toward industrial recovery is impeded, and buyers of iron and steel continue to adhere to a cautious policy in covering their needs.

Mill and furnace operations are on about the same basis as a week ago. The Illinois Steel Co. has made a slight gain in steel output, being on a 33 per cent basis, but the Inland Steel Co. and other producers are running at approximately the same rate as last reported.

Pig Iron.—New inquiries are small, ranging from carloads to 300, 400 and 500 tons. Interest is centered in 2000 tons of malleable wanted by the Auto Specialties Co., Benton Harbor, Mich., for second quarter delivery. This is the only large inquiry still pending and it is possible that it will bring out concessions below present ruling prices. On ordinary business, however, the ruling market is \$19, base, local furnace, for foundry, malleable and basic. Few orders of any size have been closed within the past week. Weakness in Southern iron is reported and some observers believe that this product will soon become a factor in some parts of this territory where the freight advantage is not too much in favor of Chicago. Recent sales of Southern foundry include 400 tons for local delivery and 200 tons for Michigan delivery, both of which were closed at \$16, base, Birmingham. In support of the belief that even lower prices might be quoted, attention is called to a Southern interest which is said to be quoting f.o.b. furnace rather than f.o.b. Birmingham, thereby reducing the freight charge which is included in the delivered price. There is little activity in charcoal, low phosphorus and silvery irons. In connection with silvery, it is to be noted that competition by electric furnaces is confined largely to grades from 9 per cent up, and does not so seriously affect 7 and 8 per cent business.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil. 1.50, delivered at Chicago....	\$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25.....	19.00
Northern high phos.....	19.00
Southern foundry, sil. 1.75 to 2.25.....	22.67
Malleable, not over 2.25 sil.....	19.00
Basic.....	19.00
Low phos., Valley furnace, sil. 1 1/2 to 2	
per cent copper free.....	33.00
Silvery, sil. 8 per cent.....	\$32.62 to 34.82

Ferroalloys.—Outside of local inquiries for two cars

of spiegeleisen and one carload of ferromanganese, the market is quiet. Some weakness has developed in 50 per cent ferrosilicon and it is now available at from \$56.50 to \$57.50, delivered.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$56.50 to \$57.50, delivered; spiegeleisen, 18 to 22 per cent, \$36 to \$37, delivered.

Railroad Equipment.—The Burlington has ordered 74 all-steel passenger carrying cars from the Pullman Co. and 56 all-steel baggage and mail cars from the Standard Steel Car Co. The Central of Georgia is expected to place 500 box cars this week and the Union Pacific will take early action on 38 passenger service cars.

Rails and Track Supplies.—Buying of standard steel rails is suspended for the present and no inquiries are now active before mills. The rail mill at Gary will be idle practically all this month. Tonnages held over from last year will supply most roads with sufficient rails for ready work and there is no pressure for buying at this time. Track fastenings are equally slack in this market.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.60c. to 1.65c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh track bolts with square nuts 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.875c. to 2c., f.o.b. mill; angle bars 2.40c., f.o.b. mill.

Bars.—Bar buying is confined to small lots from a wide variety of sources, making a fair total. Buyers lack confidence in the future and buy from hand to mouth, knowing mills can make immediate delivery. However, this condition may change almost without warning, leaving the slow buyer without stock. One mill in Chicago is now scheduled full for six weeks. An inquiry for 1000 tons for reinforcing where soft steel or rerolled bars may be used is encouraging to makers of the latter. Paul J. Kalman Co. will furnish 205 tons for highway work in Marion and Fayette counties, Ill. Bar iron demand is somewhat better and mills are operating heavier, most demand being from railroads. No bar iron has been specified for newly bought cars, and soft steel, cheaper than iron, is believed to be substituted. Rerolled bars are not active.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.10c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.18c.

Wire Products.—Good buying of wire and nails, especially the latter, has marked the past week, coming from practically all sources except from manufacturers. Nails are especially in demand. Mills now have good stocks in warehouses and can make immediate shipments. Jobbers are still engaged in inventory, but this has not delayed buying. Prices are steady and unchanged.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails \$2.65 per keg. The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Sheets.—Domestic consumers of sheets are not buying much and producers would be in a bad way except for export tonnage, which makes 50 per cent of their tonnage in some cases. The local independent continues operation at full capacity. Prices are held firmly in spite of small buying.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—Slow specification of material by car builders is rendering the plate market slack, especially as oil tank demand has fallen to nothing and other plate users do not require much material. Renewal of auto-

mobile production promises increased demand from that source. Prices remain unchanged.

The ruling mill quotations range from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Bolts and Nuts.—No revival is seen in this market and producers are operating at a slack rate, buying being in small lots. Discounts are being disregarded and every maker has his own price.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60, 10 and 10 per cent off, larger sizes, 60 and 10 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off; blank nuts \$4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—While unsettled labor conditions in the building trades are holding back much work in Chicago, this center being less active than others, prospective closing of some important projects offer hope of larger business for spring. Costs aside from labor seem well liquidated and successful establishment of the open shop will lend encouragement. Bids on the warehouse at Louisville for the Belknap Hardware & Mfg. Co. have been deferred to Jan. 30. Recent Western lettings are for moderate totals and various purposes. Prices remain unchanged at 1.50c. for car material, 1.60c. to 1.75c. for general business. Recent fabricating awards include:

Bryant Junior High School, Minneapolis, Minn., 112 tons, to American Bridge Co.

United Constock Mines Co., mill buildings, Gold Hill, Nev., 182 tons, to Minneapolis Steel & Machinery Co.

Six crude stills at Sugar Creek, Mo., for Standard Oil Co., 152 tons, to Standard Tank Car Co., Sharon, Pa.

High school building at Lawrence, Kan., 170 tons, to Federal Bridge Co.

Store building at Denver for L. R. Steel, 100 tons, reinforced concrete.

Harsh & Chapline, Northwestern Division, Craddock-Terry Co. plant at Milwaukee, 315 tons, to Lakeside Bridge & Structural Co.

City of Sheboygan, Eighth Street bascule bridge, 600 tons, to Wisconsin Bridge & Iron Co., Milwaukee (reported low bidder Dec. 1).

Pending business includes:

Sewage disposal plant, Jones Island, Milwaukee, 500 tons, bids closed Jan. 18.

Chicago Union Station headhouse and concourse, 15,000 tons, bids asked.

Los Angeles & Salt Lake Railroad, subsidiary of Union Pacific, freight station, Los Angeles, Cal., 500 tons, bids in.

Putnam Department Store, Davenport, Iowa, 800 tons.

Interstate bridge, Prescott, Wis., 500 tons, bid Feb. 2.

Toltz, King & Day, Pioneer Building, St. Paul, Minn., consulting engineers.

The mill quotation on plain material ranges from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Cast Iron Pipe.—Though fully 50 miles of water-mains are known to be under consideration by municipalities, inquiry for cast iron pipe is not yet active. The last week of the month is expected to yield large buying when appropriations have been made. Prices are being shaded \$2 in the present lull, but are expected to stiffen on renewed inquiry. A contractor has been awarded 750 tons, but has not awarded the material to a maker. Bids will be opened Jan. 30 at St. Paul on 1500 tons, Jan. 24 on 115 tons at Lake Wilson, Minn., and Minneapolis is expected to inquire shortly for two and a half miles of 24-in. pipe, about 1700 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$47.10 to \$48.10; 6-in. and above, \$43.10 to \$44.10, class A and gas pipe, \$4 extra.

Coke.—Sellers report a moderate improvement in buying and a greater willingness on the part of purchasers to contract over periods. Current consumption of foundry coke in this territory is variously estimated at from 25 to 40 per cent of normal.

Old Material.—Buying of heavy melting steel and similar grades last week has not been continued and except for some tonnages of malleable for foundries and a small buying by rolling mills, the market is dull. Prices are stationary and in some cases weaker. Railroad lists include the Rock Island, 4250 tons, including 1000 tons steel rails, the Chicago Great Western, 1000

tons, and the Monon 400 tons. Cast iron car wheels were quoted in error last week and have been stationary at \$15.50 to \$16. Other prices are unchanged.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$15.00 to \$16.50
Relaying rails	23.00 to 27.50
Cast iron car wheels	15.50 to 16.00
Rolled or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00
Shovelling steel	11.00 to 11.50
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.50 to 9.00

Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.00 to 19.50
Steel car axles	12.50 to 13.00
No. 1 bushing	8.25 to 8.75
No. 2 bushing	6.00 to 6.50
Cut forge	10.25 to 10.75
Pipes and flues	7.00 to 7.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	12.50 to 13.00
No. 1 machinery cast	13.00 to 13.50
No. 1 railroad cast	12.50 to 13.00
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Buffalo

BUFFALO, Jan. 17.

Pig Iron.—No. 2 plain iron is being offered through an Eastern broker for \$19.50—the only departure from the \$20 base price standard which Buffalo furnaces have maintained as the lowest they will go. Some good inquiries are in the market, one for 3000 tons; one for 2000 tons and several for tonnages from 250 to 500 tons. The radiator interests made their recent purchase of 7000 tons at one furnace and on lowest silicons paid \$19. Inquiry holds up, but a great portion is from outside the district. Furnaces are making occasional quotations for second quarter delivery, but are reluctant to book any business beyond April 1. Operation is the same and after minor repairs the Donner Steel Co. will again operate the furnace which was banked a week ago.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.25 to 2.25 sil.	\$20.00 to \$21.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—All sellers find better inquiry and only a few find an increase in actual selling. Bar and shape inquiry is brisk and in one office the size of tonnages on which prices are sought, shows improvement. The sheet market is firm at \$3, although a New York State buyer offering a 500-ton order claims to have a price of \$2.85 and that he is holding off for a more favorable quotation. Bolts and nuts and tin plate are extremely quiet—though in other cities tin plate is understood to be in fair demand. An inquiry for 500 tons of bars for a buyer within the district is out but has not been awarded on bids of 1.50c. No structural awards have been made—in fact, little work of any size is in immediate prospect. One structural mill has sufficient orders to keep going without seeking small business where immediate delivery is a factor.

Warehouse Business.—In comparison with conditions a year ago, the market is livelier. Prices are lowest, in the judgment of warehouse interests and a shading of prices on plates and sheets to be in alignment with new schedules announced last week, makes the adjustment complete.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheet, No. 28, 6.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 7.55c.

Old Material.—Dealers are not interested in the buying desires of two mills—at present prices. Some purchases of heavy melting steel have been made, but the majority of dealers have bought this material at \$15 and \$16 and have no willingness to sell at \$13.50. In consequence the tonnages are small. Generally, feeling is better and new prices are expected before Feb. 1. Inquiries for turnings and borings from the Youngstown and eastern Pennsylvania fields have not met with response here.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$13.00 to \$14.00
Low phosph., 0.04 and under.....	17.00 to 18.00
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels.....	16.50 to 17.50
Machine shop turnings.....	7.50 to 8.00
Cast iron borings.....	7.00 to 8.00
Heavy axle turnings.....	10.50 to 11.50
Grate bars.....	12.00 to 13.00
No. 1 bushing.....	10.00 to 11.00
Stove plate.....	15.00 to 16.00
Bundled sheet stampings.....	8.00 to 9.00
No. 1 machinery cast.....	17.00 to 18.00
Hydraulic compressed.....	10.50 to 11.50
Railroad malleable.....	13.00 to 14.00

St. Louis

ST. LOUIS, Jan. 17.

Pig Iron.—More interest is being shown in pig iron than at any time during last month, and there is a better feeling among buyers. More sales are being made and additional shipping instructions are being given against contracts. The sale is reported of 700 tons of foundry iron to a local melter, while other purchases to local melters were of carload to 200-ton lots. A central Illinois radiator corporation bought 500 tons of foundry, while a southern Illinois melter bought 60 tons, and other sales of carloads are reported. There is an inquiry out from a local melter for 300 tons of foundry iron. The market is unchanged at \$19, Chicago, for Northern, although a good-sized tonnage might be had at less, and \$16.50, Birmingham, for Southern iron. A Kansas City concern wants 25 tons of ferromanganese.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25.....	\$21.88
Northern malleable, sil. 1.75 to 2.25.....	21.88
Basic.....	21.88
Southern foundry, sil. 1.75 to 2.25.....	22.41

Finished Iron and Steel.—The demand from the railroads is increasing, and a number of inquiries for iron and steel were issued during the last week, and the indications are that there will be freer buying. The Missouri, Kansas & Texas wants 200 tons of structural shapes and plates for repair work. The St. Louis & San Francisco Railway is in the market for 150 tons of shapes. The Texas & Pacific has an inquiry out for 50 tons of locomotive tires on contract. The Texas Construction Co., Dallas, is in the market for 3100 tons of 70-lb. rails. The San Antonio Public Service Co. has asked for prices on three miles of 65, 70 and 90-lb. rails, and a Pine Bluff, Ark., concern desires quotations on 70-lb. rails, without stating quantity desired. The Missouri Pacific placed an order for 1000 kegs of track spikes, dividing the order between two concerns. The United Railways Co. of St. Louis now in receivership will ask the Federal Court this month for permission to build 50 additional cars to cost \$600,000. Bids are to be received shortly on St. Mary's Hospital, St. Louis County, involving 930 tons of structural shapes and 100 tons of bars. The local situation is upset by the prospect that the Building Trades Council will reject the proposal of the master builders for a reduction of 20 per cent in the base wage scale of \$1.25 an hour, the carpenters' vote being 25 to 1 against the proposition.

For stock out of warehouse we quote: Soft steel bars, 2.62½¢. per lb.; iron bars, 2.62½¢.; structural shapes, 2.72½¢.; tank plates, 2.72½¢.; No. 10 blue annealed sheets, 3.47½¢.; No. 28 black sheets, cold rolled, one pass, 4.15¢.; cold drawn rounds, shafting and screw stock, 3.65¢.; structural rivets, \$3.52½ per 100 lb.; boiler rivets, \$3.62½; tank rivets, 7/16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 65-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, 44; and tapped, \$3.75 off list.

Coke.—The demand for coke is increasing, sales of one by-product producer being 800 tons for the week, with scattering orders for a carload or more. There is an inquiry pending for 2000 tons of furnace coke for shipment through January and February to the Southwest. Colder weather has brought forth increased consumption and demand for domestic coke. There is some inquiry from railroads for blacksmith coke.

Old Material.—The market for old material is weak and unsteady and there is absolutely no trading of any description. However, prices have not declined to any appreciable extent, owing to the fact that dealers are looking for a better market in the near future and are absorbing all railroad offerings at present levels. Relaying rails are in demand and some good inquiries have developed, although no large contracts are reported closed as yet. Current railroad offerings include: Southern Railway, 8100 tons; Texas Pacific Railway, 1750 tons; Chicago, Rock Island & Pacific, 830 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails.....	\$15.00 to \$15.50
Steel rails, rerolling.....	11.50 to 12.00
Steel rails, less than 3 ft.....	11.50 to 12.00
Relaying rails, standard section.....	23.00 to 28.00
Cast iron car wheels.....	14.00 to 14.50
No. 1 heavy railroad melting steel.....	10.50 to 11.00
No. 1 heavy shovelling steel.....	10.00 to 10.50
Ordinary shovelling steel.....	9.00 to 9.50
Frogs, switches and guards cut apart.....	10.50 to 11.00
Ordinary bundle sheet.....	4.50 to 5.00

Per Net Ton	
Heavy axles and tire turnings.....	5.00 to 5.50
Iron angle bars.....	13.50 to 14.00
Steel angle bars.....	9.00 to 9.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	13.50 to 14.00
Wrought iron arch bars and transoms.....	13.00 to 13.50
No. 1 railroad wrought.....	9.50 to 10.00
No. 2 railroad wrought.....	8.50 to 9.00
Railroad springs.....	11.25 to 11.75
Steel couplers and knuckles.....	11.25 to 11.75
Locomotive tires, 42 in. and over, smooth inside.....	8.00 to 8.50
No. 1 dealers' forge.....	7.00 to 7.50
Cast iron borings.....	5.50 to 6.00
No. 1 bushings.....	8.50 to 9.00
No. 1 boilers cut in sheets and rings.....	7.00 to 7.50
No. 1 railroad cast.....	13.00 to 13.50
Stove plate and light cast.....	11.50 to 12.00
Railroad malleable.....	9.50 to 10.00
Agricultural malleable.....	9.00 to 9.50
Pipes and flues.....	7.50 to 8.00
Heavy railroad sheet and tank.....	6.00 to 6.50
Light railroad sheet.....	4.50 to 5.00
Railroad grate bars.....	9.50 to 10.00
Machine shop turnings.....	4.50 to 5.00
Country mixed iron.....	6.50 to 7.00
Uncut railroad mixed.....	7.00 to 7.50
Horseshoes.....	9.50 to 10.00
Railroad brake shoes.....	9.00 to 9.50

Birmingham

BIRMINGHAM, ALA., Jan. 17.

Pig Iron.—By the middle of the month Birmingham pig iron was selling at \$16 a ton in competitive territory, and that price was as often made as \$16.50 in strictly Southern territory. One maker held for higher prices, but there was no business done above the general scale. Makers report bookings of small tonnages for prompt shipment. A lot of buying expected to have been done by sanitary pipe makers did not materialize. The lower scale of prices announced by pipe makers is credited with having provoked a temporary lull. The conviction remains that this buying will start again soon. The leading pipe interest is credited with having quietly bought a minimum of 20,000 tons at bottom prices. One maker is believed to have taken 10,000 tons. The American Radiator Co. has lately taken 2500 tons for Southern plants, which are continuously on a 100 per cent production base. Small iron tonnages continue to move to the Pacific Coast out of Mobile, 50 tons leaving this week. Several lots went into Ohio and other competitive fields last week on a base of \$16. Large tonnages for that delivery could be gotten under \$16, the lots entering that field at \$16 being small ones.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$16.00 to \$16.50
Basic.....	15.00 to 15.50
Charcoal, warm blast.....	32.00

Cast-Iron Pipe.—Sanitary pipe scale has been lowered to \$37 for standard, \$28 for extra heavy, \$40 for fittings

and \$36 for 8 to 12-in. sizes. Trade simmered down while digesting the new scale. High pressure pipe works feel confident of considerable business this spring. Base is \$33.

Finishing Mills.—The Tennessee company continues the operation of five of its nine open-hearth furnaces, car works, rail mill and Bessemer plate, guide and bar mills. The Gulf States Steel Co. is operating three of the six open hearths and all the finishing mills. New business in wire and nails has reopened and is better than it was just before the holidays. Wire mill operations have increased over December, in which month there was a considerable drop from November and October operations. Hoop and band mills remain idle.

Old Material.—Cast scrap is moving with fair regularity out of yards, but steel scrap is on the dead list. Prices are unchanged from last week.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$11.00 to \$12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, Jan. 17

Pig Iron.—The contract for segments for the vehicular tunnel between New York and New Jersey, involving over 100,000 tons of pig iron, continues to be the leading topic of discussion among foundrymen. The largest inquiry of any foundry is for 2500 tons a month for 20 months, or 50,000 tons, and it is evident that no foundry is figuring on doing all the work. Furnaces continue to maintain a very conservative attitude and are slow to quote for delivery so far in the future. In the past when tunnel contracts have been awarded, the pig iron market has advanced, but at present the market is stationary without any tendency to advance. It is expected that a more definite attitude on the part of furnaces will be disclosed soon. The melt in the metropolitan district seems to be increasing moderately and a hopeful feeling prevails. There is very little inquiry and selling is limited. Prices show little, if any, change.

We quote delivered in the New York district as follows having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25 ..	\$23.02 to \$24.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75 ..	23.02 to 23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25 ..	22.52 to 23.02
Buffalo, sil. 1.75 to 2.25 ..	24.16 to 24.66
No. 2 Virginia, sil. 1.75 to 2.25 ..	27.16 to 28.16

Ferrolloys.—Demand for ferromanganese is still confined to carload lots and sales of about 100 tons of the British alloy are quoted at \$58.35, seaboard. Consumers are interested only in hand-to-mouth necessities. There is no activity in the spiegeleisen market nor is there any interest shown by consumers of manganese ore, quotations remaining nominally unchanged. There are signs of more activity in the 50 per cent ferrosilicon market, but quotations are unchanged. There have been sales of carload lots at prevailing prices and it is not unlikely that the week's developments will reveal the closing of some contracts for 1922 consumption. Quotations are as follows:

Ferrolloys

Ferromanganese, domestic, delivered, per ton.	\$60.00 to \$63.00
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegeleisen, 20 per cent, furnace, per ton..	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton.	\$55.00 to \$60.00
Ferrotungsten, per lb. of contained metal.40c. to 50c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr. per lb. Cr. delivered.11c. to 14c.	
Ferrovandium, per lb. of contained vanadium	\$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York	50c. to 60c.

Finished Iron and Steel.—With limited buying in all steel products still the rule, the steel companies are making further concessions in prices to get orders. On plates, shapes and bars 1.45c., Pittsburgh, is now a frequent quotation, and business in plates and shapes has been taken as low as 1.40c., Pittsburgh. Bars do not show such pronounced weakness, 1.45c. appearing to be the minimum. The low prices are not confined to large tonnages. A jobber's order for five carloads of steel was taken by a leading producer at 1.45c. for the shapes and 1.50c. for the bars. A competitor had quoted 1.45c., Pittsburgh, on the bars, but the order for shapes at 1.45c. was accepted only upon the condition that the bars at 1.50c. were included. Plates in lots not exceeding 100 tons have been sold at 1.45c., Pittsburgh, and in a few instances at 1.40c. Many of the mills continue to quote 1.50c. on these three products, but make their concessions later to close the business. The New York Central Railroad last week opened bids on 3000 tons of plates, shapes and bars, 500 tons of forging billets and 600 tons of wire nails and other wire products. Bids were put in in various ways, including mill and delivered prices. The Worth Steel Co. bid 1.60c., mill, on plates. The Carnegie Steel Co. bid 1.605c., Pittsburgh, on plates, shapes and bars; Cambria Steel Co. bid 1.50c., Pittsburgh, on all three products; the Alan Wood Iron & Steel Co. bid 1.61c., mill, on plates; the Donner Steel Co., 1.60c., Buffalo, on plates and small shapes, and 1.50c., Buffalo, on bars; the Lackawanna Steel Co., 1.65c., delivered West Seneca, N. Y., on plates, shapes and bars; the Bethlehem Steel Co., 1.825c., delivered Newberry Junction, Pa., on plates, shapes and bars; Jones & Laughlin Steel Co., 1.50c., Pittsburgh, on plates, shapes and bars; the Bourne-Fuller Co., Cleveland, 1.605c., Cleveland, on bars. On forging billets there were bids of \$32, Pittsburgh, and \$33, Buffalo, the Lackawanna Steel Co. bidding \$33, delivered West Seneca, N. Y. The Alan Wood Iron & Steel Co. bid \$36, f.o.b. its mill. The Bourne-Fuller Co. bid \$37.10, Cleveland, and the Bethlehem Steel Co., \$40.32, delivered Newberry Junction. The Youngstown Sheet & Tube Co. put in a bid of 2.50c., Youngstown, on wire nails, other makers bidding 2.50c., Pittsburgh. Inquiries for finished steel are few in number and mostly for small tonnages. Exceptions are requests for bids on 2000 tons of bars for construction work at Seattle, Wash., on which Eastern contractors are figuring, and on 1700 tons of plates for tanks for the Vacuum Oil Co., New York. Little new structural steel work is up for bids. The new projects include 500 tons for an apartment house on Seventy-fifth Street, New York; 300 tons for an apartment house on East Eighty-first Street, New York; 300 tons for a branch of the Corn Exchange Bank, New York; 500 tons for a private residence on Fifth Avenue, New York. Two sections of the new Standard Oil building will require about 1500 tons of steel. The American Bridge Co. will fabricate 300 tons for a railroad bridge in California. The Lackawanna Steel Co. will furnish 100 tons for a bridge for the Long Island Railroad. The Bethlehem Steel Bridge Co. will fabricate 1000 tons for a building at Amsterdam, N. Y.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.55c. to 1.88c., plates, 1.83c. to 1.88c., structural shapes, 1.82c. to 1.88c., but iron, 1.83c. to 1.88c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 35c., the domestic rate.

Warehouse Business.—Business has apparently shown a slight improvement since the recent revision of prices, but while this is viewed with satisfaction, there is a feeling that it may not be permanent. Sheet prices are slightly weaker, black sheets being obtainable at 3.85 per lb. for No. 28 gage, although the usual quoted price is still 4c. per lb. Galvanized sheets can also be had at better than 4.85c. per lb. Warehouses handling electric sheets report a recent spurt of activity in this material from both small and large consumers, which were evidently unwilling to wait for mill delivery. The brass and copper market maintains an active tone and orders are reported to be slightly larger as well as more numerous. Copper screening is notable among active brass and copper items, as dealers are now beginning to stock up for spring and summer

sales. The wrought iron and steel pipe business has entered upon its dull season, January, February and early March. We quote prices on page 258.

High Speed Steel.—The market is inactive and prices continue weak. Producers quote from 85c. to 95c. per lb. and as low as 80c per lb. on 18 per cent tungsten high speed steel, with \$1.05 per lb. still being held on some special brands.

Cast-Iron Pipe.—Orders come in for spring delivery from private companies in satisfactory volume and prices remain firm. Whereas a year ago many foundries had shut down ostensibly for repairs, the real reason being lack of orders. Repair shutdowns now are genuine. We quote per net ton, f.o.b., New York, carload lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Old Material.—An eastern Pennsylvania heavy melting steel consumer reduced buying prices on the yard grade 50c. to \$11 on Monday, thereby causing a corresponding reduction in the New York f.o.b. price. Borings are 50c. stronger because of a demand from several consumers. Otherwise the market is without change and lifeless.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$7.50 to \$8.00
Steel rails, short lengths, or equivalent	8.50 to 9.00
Re-rolling rails	9.50 to 10.00
Relaying rails, nominal.....	28.00 to 30.00
Steel car axles.....	10.00 to 10.50
Iron car axles.....	18.50 to 19.00
No. 1 railroad wrought.....	10.50 to 11.00
Wrought iron track.....	8.50 to 9.00
Forge fire	5.00 to 5.50
No. 1 yard wrought, long.....	9.00 to 9.50
Cast borings (clean).....	7.50 to 8.00
Machine-shop turnings.....	4.00 to 5.00
Mixed borings and turnings.....	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	7.00 to 7.50
Stove plate	9.00 to 10.00
Locomotive grate bars.....	9.00 to 10.00
Malleable cast (railroad).....	8.00 to 8.50
Car wheels	10.50 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$16.50 to \$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size.....	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cleveland

CLEVELAND, Jan. 17.

Iron Ore.—Many consuming interests have made inquiries as to probable ore prices for 1922 in order to determine how much they should write down their ore in their inventories for income tax purposes, but sellers have not been able to give any definite information, as prices for this year have not been considered. Some consumers have stated that they will inventory their ore at at least \$1 a ton below 1921 prices. A year ago, consumers cut ore values in their inventories from 50c. to \$1.50 a ton below the 1920 prices and when the \$1 a ton reduction was finally made, their inventories were readjusted on that basis. With the decline in pig iron and steel prices and the losses sustained by operators of steel plants and blast furnaces in 1921, ore consumers seem inclined to insist on sharp reductions in ore prices for this year. Last year was, also, very unprofitable to the mining companies and they naturally would like to keep ore prices at a point where they might expect some profit this year. However, the cost of mining was reduced last year by the various reductions of miners' wages, and a further reduction in the vessel carrying rate for ore is looked for during the coming season, and consumers are expected to ask for all the benefit of the reduced cost of mining and shipping ore.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—The demand for foundry iron shows some increase, but sales are almost wholly in small lots, no single orders being reported for over 300 tons. Some of the smaller foundries that consume around 50 tons of iron or less per month are buying for six months'

requirements, but nearly all purchases are for only immediate requirements. One Lake furnace during the week sold 5000 tons, all in small lots and mostly for prompt shipment, but sales by other producers were lighter. Shipments show a gain over the first half of December, but the improvement in foundry conditions is only slight, apparently being more pronounced in the case of malleable foundries engaged in railroad work. On foundry iron \$19 has become a more general Lake furnace price, although for shipments to consumers in close proximity to the furnace, \$20 is still being obtained. A leading producing interest which has been holding to \$20 for foundry iron for shipment from its Valley furnace has reduced its price to \$19.50. The Ford Motor Co. is supplying foundry iron to some consumers in this territory making flywheels for Ford cars and it is understood to be charging \$19.50, Detroit, for this iron. Prices on Southern foundry iron have again declined and this iron is now being freely offered at \$16 of 1.75 to 2.25 per cent silicon iron.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	\$20.21 to \$20.71
Northern No. 2 fdy., sil. 1.75 to 2.25.....	19.00 to 20.00
Southern fdy., sil. 2.25 to 2.75.....	23.17
Ohio silvery, sil. 8 per cent.....	32.86
Standard low phos., Valley furnace.....	33.00

Semi-Finished Steel.—The market is very dull. One sale of 250 tons of sheet bars is reported at \$29 which is the common quotation for sheet bars and slabs.

Finished Iron and Steel.—While there seems to be more business in prospect than during the latter part of last year, little has come out so far this month. The market lacks firmness and while the 1.50c., price which has held for some time on steel cars, plates and structural material is still the minimum quotation by most mills, concessions from this price have appeared. A further concession of \$2 a ton to 1.40c. has appeared on hard steel re-enforcing bars. Very little steel has been bought by the automobile companies this month. The Ford Motor Co., which usually covers about the middle of the month for the following month's requirements, is understood to have deferred its purchases. A lake shipyard has taken a small boat requiring 600 tons of steel which has been placed and one or two ore boats are still being figured on. The Port Arthur Ship Building Co., Port Arthur, Ont., has placed 4,000 tons of steel for a lake boat ordered last month by a Canadian interest. This business went to the leading interest as an export order. The agricultural implement manufacturers are displaying little activity although some small orders are coming from this source. In structural lines, local fabricators are figuring on a warehouse for the Belknap Hardware Co., Louisville, Ky., which is the only new inquiry in structural line.

Jobbers quote steel bars, 2.36c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3.25c.; No. 9 annealed wire, 2.75c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Wire Products.—Reports of weakness in the market are frequent and it is definitely established that a concession of 10c. to \$2.40 a keg has appeared on wire nails. Mention is made elsewhere of the decision to adopt an arbitrary differential on wire for Cleveland delivery in place of the present regular freight differential.

Sheets and Tin Plate.—The demand for sheets is rather slow and few orders are being placed for more than car lots. Many consumers are only filling in their stocks. While regular prices are being firmly held buyers are apparently skeptical about their being maintained and consequently they are not placing first quarter contracts. A weakness in tin plate has developed in that quotations have appeared based on an Ohio shipping point instead of f.o.b. Pittsburgh.

High Speed Steel.—In the absence of a demand, the market is weak and while 85c. per lb. is nominally the minimum quotation, it is evident that an inquiry of any size would bring out a 75c. price.

Coke.—There is quite a little activity in car lots of

foundry coke for prompt shipment. Prices are unchanged at \$4 to \$4.25 for standard Connellsville makes.

Bolts and Nuts.—The demand for bolts and nuts has improved, now that inventories are mostly over, but orders are generally for small lots, evidently for filling in stocks. Prices are well maintained. Rivet manufacturers are getting a fair volume of small lot business and one order for 60 tons was placed by a lake shipyard, being the first order from this source for some time. The recent establishment of prices at a lower level of 2.25c. for structural and 2.35c. for boiler rivets has not stabilized prices, as concessions of \$1 from these prices are reported.

Old Material.—The market became a little more active during the week owing to a demand from dealers who have been buying to cover against recent contracts placed by Youngstown mills for steel making scrap. There was also some demand for heavy melting steel for Massillon shipment. No further buying by consumers was reported, but some mills are expected to come into the market again around the end of the month. Some speculative buying is being done by dealers. Prices are firm on nearly all grades and there is a feeling that it would not take much of a buying movement to stiffen up the prices somewhat.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$12.00 to \$12.50
Steel rails, under 3 ft.....	12.50 to 13.00
Steel rails, rerolling.....	11.00 to 14.50
Iron rails.....	12.00 to 12.50
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	13.00 to 13.50
Cast borings.....	8.60 to 9.00
Machine shop turnings.....	8.00 to 8.25
Mixed borings and short turnings.....	8.60 to 9.00
Compressed steel.....	9.00 to 9.50
Railroad wrought.....	12.00 to 12.50
Railroad malleable.....	12.50 to 13.00
Light bundled sheet stampings.....	6.00 to 7.00
Steel axle turnings.....	9.00 to 10.00
No. 1 cast.....	15.00 to 16.00
No. 1 busheling.....	8.25 to 8.75
Drop forge flashings, over 10 in.....	7.50 to 8.00
Drop forge flashings, under 10 in.....	7.50 to 8.00
Railroad gate bars.....	12.75 to 13.00
Stove plate.....	13.00 to 13.25
Pipes and flues.....	8.50 to 9.00

Will Withdraw Differential on Wire

CLEVELAND, Jan. 17.—The freight differential of 21c. per 100 lb. on Bessemer and bright wire for Cleveland delivery will be withdrawn and in its place an arbitrary differential of 10c. or 10½c. will be established, making what would be about equivalent to using Youngstown as a basing point. This change has resulted from efforts of the Cleveland bolt and nut manufacturers who asked that Cleveland be made a basing point on bolt wire and wire rods used in their plants in order to remove the disadvantage as compared with the Pittsburgh bolt and nut makers of the 21c. freight rate from Pittsburgh to Cleveland. With the change, the Cleveland bolt and nut makers have secured half the concession they asked for on wire. No announcement as yet has been made as to what will be done in the way of fixing an arbitrary differential for Cleveland in the place of the Pittsburgh-Cleveland freight rate on wire rods, nails and some other products, but it is understood that new differentials on these products are under consideration.

Ore Producers Will Attend Washington Hearing

At a meeting of the rate committee of the Lake Superior Iron Ore Association, held Jan. 16, plans were outlined for presenting data before the Interstate Commerce Commission in connection with the commission's general investigation of railroad freight rates. F. B. Richards, M. A. Hanna & Co., H. G. Dalton, Pickands, Mather & Co., and John A. Topping, Republic Iron & Steel Co., representing ore shippers, will present statements outlining the present condition of the iron and steel industry and point out the necessity of lower rail rates on ore. Percy Sprague, traffic manager M. A. Hanna & Co., will present a brief showing old rates on ore and the percentage of increases in the present rates. The representatives of the Ore Association will appear before the Interstate Commerce Commission either Jan. 21 or 23.

Boston

Boston, Jan. 17.

Pig Iron.—Most eastern Pennsylvania furnaces hold to \$20 or \$20.50 furnace base with regular silicon differentials, but are getting comparatively little business in this territory. At least three furnaces, however, this week sold iron on a basis of \$19.50 for silicon 2.25 to 2.75, and even less for No. 2 plain, and secured most of the business offered. One Buffalo furnace, holding for \$20 furnace, for any grade of silicon a fortnight ago, this week sold No. 2X iron at \$19.50. Another Buffalo furnace quotes \$19 furnace base, and central Pennsylvania iron is obtainable at \$19.50 furnace base. Because furnaces are closed and have limited stocks, and because of the limited demand, it is difficult to determine what the market on Virginia iron really is. Virginia iron unquestionably can be had at \$22 furnace, which represents a decline. Alabama iron also is lower, but still not on a competitive basis in this territory with eastern Pennsylvania or Buffalo. The pig iron market in general, therefore, appears easier notwithstanding the stand taken by most eastern Pennsylvania furnaces. Sales for the week include 1,000 tons No. 2 plain, second quarter delivery, to a maker of textile machinery; 200 tons No. 2X to the American Hardware Corporation, New Britain, Conn.; 200 tons No. 2X, special analysis, to a car wheel maker; 200 tons No. 2X to a Massachusetts foundry, first quarter delivery and all eastern Pennsylvania iron, and scattering 100 ton lots Buffalo No. 2X and No. 1X, and one 200 ton lot No. 2X, first and second quarter delivery. Sales in the aggregate amount to about 2500 tons. Foundries report business as shaping up slowly.

We quote delivered at common New England points as follows, having added to furnace prices \$4.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75.....	\$24.06 to \$25.06
East. Penn., silicon 1.75 to 2.25.....	23.56 to 24.56
Buffalo, silicon 2.25 to 2.75.....	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25.....	24.46 to 25.46
Virginia, silicon 2.25 to 2.75.....	29.08 to 29.58
Virginia, silicon 1.75 to 2.25.....	28.58 to 29.08
Alabama, silicon 2.25 to 2.75.....	27.16 to 27.66
Alabama, silicon 1.75 to 2.25.....	26.66 to 27.16

Warehouse Business.—Local warehouse prices on iron and steel have been revised once more. This time steel half rounds, ovals, half ovals and bevels are 83½c. per 100 lb. base higher; steel bands 15c. to 30c., blue annealed sheets 25c., cold-rolled steel 20c., and most of the other kinds carried 16½c. lower. No change is noted in black and galvanized sheets. Broken stocks of certain kinds of iron and steel are beginning to develop. For the first time since the week before Christmas, a real improvement in the demand is noted. The market is not active, however. Some firms quote stove bolts at 75 and 10 per cent discount and others 80 per cent. Movement of all kinds of bolts and nuts out of stock is better. Local chain quotations have been reduced to conform with a cut of \$3 to \$10 a ton in manufacturers' lists. Most everybody has marked up cap screws 5 per cent.

Jobbers now quote: Soft steel bars, \$2.55½ per 100 lb. base; flats, \$3.05½; concrete bars, stock lengths, \$2.55½; structural angles and beams, \$2.65½; plates, \$2.65½ to \$2.83; two steel, \$3.85 to \$4.25; open hearth spring steel, \$4.50; crucible spring steel, \$11.50; bands, \$3.15½ to \$3.53; hot steel, \$3.15½; cold rolled steel, \$3.55 to \$4.05; toe calk steel, \$8; refined iron, \$2.55½ per 100 lb. base; best refined iron \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50.

Finished Iron and Steel.—The Boston & Albany Railroad has purchased \$50,000 to \$55,000 worth of frogs and switches, 5,000 kegs of spikes, 2,700 kegs of track bolts and a miscellaneous lot of maintenance equipment. No sizable tonnages of structural steel were placed this week, but prospects are more numerous and large awards are expected within the next fortnight. On one 400-ton Boston job, as low as \$55 delivered on the work, was bid, but a change in specifications has delayed an award. At least one mill has accepted small shape business at 1.45c. Pittsburgh base, and bars have been sold in this territory as low as 1.45c., but generally speaking mills are maintaining 1.50c., and occasionally securing a little better. Rail business from the smaller New England railroads is expected shortly.

The Worcester, Mass., works American Steel & Wire Co., production is 55 to 60 per cent of normal, or 15 to 20 per cent above the 1921 average. Approximately 5,000 are employed.

Coke.—More small consumers of by-product foundry coke have contracted for first half requirements at price ruling on date of shipment, but actual shipments from New England ovens show little, if any, improvement, because of the low operating ratio of the average foundry in this territory. Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting foundry coke on a basis of \$10.40 delivered where the local freight does not exceed \$3.40.

Old Material.—The Crompton & Knowles Loom Works, Worcester, Mass., is in the market for 2,000 tons No. 1 machinery cast for second, third and fourth quarter delivery at or about \$18 delivered, and will pay spot cash. Because of limited supplies, few dealers want to sell for delivery so far ahead. One 100-ton lot of No. 1 machinery, prompt delivery, sold this week at \$18.25 delivered Massachusetts point. Most owners of textile machinery scrap want \$18.50 to \$19 delivered. Dealers continue to report more or less invisible buying of machinery cast by foundries from local or nearby yards, but the big market is quiet. Eastern Pennsylvania interests are in the market for a round tonnage of skeleton scrap at \$9.75 delivered, but has had no offers, and efforts to buy forge fire scrap and stove plate, eastern Pennsylvania delivery, at prices under those quoted here, have been unavailing. Dealers are offering \$8.10, including tax, f.o.b. New England shipping point, for chemical cast iron borings, but securing little. In fact, both kinds of cast iron borings are in limited supply and the strongest thing in the old material price list to-day.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$17.50 to \$18.50
No. 2 machinery cast.....	15.50 to 16.50
Stove plate.....	15.00
Railroad malleable.....	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$8.00 to \$8.25
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought.....	9.50 to 10.00
Wrought pipe (1-in. in diam. over 2 ft. long).....	7.00 to 7.25
Machine shop turnings.....	3.50 to 4.00
Cast iron borings, rolling mill.....	7.00 to 7.50
Cast iron borings, chemical.....	7.50 to 8.00
Blast furnace borings and turnings.....	3.50 to 3.75
Forged scrap and bundled skeleton.....	1.50 to 5.00
Street car axles and shafting.....	10.50 to 11.00
Car wheels.....	11.50 to 12.00
Rolling rails.....	10.00 to 10.50

Cincinnati

CINCINNATI, Jan. 17.

Pig Iron.—There was very little change in the market during the week but the prospects, in the opinion of most sellers, are more promising. In the southern section, on very little activity, the price has receded another 50c. a ton, and is now generally quoted at \$16, Birmingham. One Southern furnace, with a freight advantage over Birmingham, is quoting \$16, furnace, making the delivered price in Cincinnati \$20.12. This can hardly be considered the market on Southern iron, however. There are evidences that Southern prices are firming up, as last week furnaces were turning down without consideration all offers under \$16. The feature of the market is undoubtedly the inquiry of the American Brake Shoe Co., which operates one of its plants near Cincinnati, for 2500 tons a month for 20 months, delivery to commence May 1. A Cincinnati melter is inquiring for 1000 tons of foundry iron for first half shipment and a Louisville melter is in the market for 500. A Dayton melter is inquiring for 250 and the American Car & Foundry Co. a similar amount for its Huntington, W. Va., plant. A car wheel manufacturer is inquiring for 200 tons of charcoal for its Louisville plant. Other inquiries are mostly for carload lots, though occasionally 100 tons are specified. Sales include 250 tons of Southern iron to a Southern Railroad, and a similar tonnage to an Indiana manufacturer, both at \$16, Birmingham. A local melter bought 150 tons, another 100 tons, and a nearby melter 100 tons of mal-

leable. Some sales of ferroalloys were also reported at regular schedules. Several hundred tons of Southern iron, in small lots, were disposed of by the furnace mentioned above, on the basis of \$15.60, Birmingham.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	21.00
Ohio silvery, 8 per cent sil.	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.02
Basic, Northern	22.02
Malleable	22.52

Finished Material.—There has been little improvement in the market for finished material since the first of the year, although from reports being received the indications are that fair business will develop around Feb. 1, when inventories will be completed and jobbers and manufacturers will have a chance to see how their stocks stand. The largest order reported during the week was one for 600 tons of structural shapes for a highway bridge being erected in the Cincinnati district. Several orders for 100 tons of reinforcing bars were also booked, but with these exceptions most business was confined to carload lots. The sheet market is quiet, although there is one inquiry out for 150 tons of galvanized, which is expected to close this week. The L. & N. Railroad will close during the week on 3500 tons of splice bars and 11,300 kegs of track spikes. Competition for this order is reported to have been very keen and it is expected that some low prices will develop. There have been no changes in prices of steel. Bars, shapes, and plates are still quoted at 1.50c. and black and galvanized sheets at 3c. and 4c. respectively. The structural field is looking up nicely and a number of new projects will come up shortly. The National Biscuit Co. has acquired property on Hunt Street, Cincinnati, on which will be erected a seven-story steel building, estimated to cost with equipment, \$2,500,000. Plans for this building are now being completed by John P. Zimmerman, New York, architect for the company. The directors of the Cincinnati Terminal Warehouse Co., which has an option on the plant of the Fay & Egan Co., decided at a meeting recently, to notify the Fay & Egan Co. to vacate the premises, as it is the intention to tear down the buildings preparatory to the construction of a terminal warehouse to cost \$2,500,000. Taking up of the option on this property is expected to hasten the erection of the new plant of the Fay & Egan Co., plans for which are now being prepared. The county commissioners of Hamilton and Claremont counties, have decided to build a suspension bridge over the Little Miami River near Cincinnati, in which 300 tons of steel will be involved. A new hotel is also proposed for Columbus, Ohio, to have 1000 rooms and a motion picture theatre. An addition to the Longview Hospital for the Insane will likely go ahead this spring, plans having been posted by Elzner & Anderson, who will receive bids up to Feb. 13. The addition will be, of course, concrete and will cost approximately \$300,000. The Pollak Steel Co. is asking bids on an addition to its Chicago plant involving 200 tons of structural steel. Plans for the Indianapolis Athletic Club, which it was expected would be ready by Jan. 16, will be sent out about Feb. 1. R. C. Daggett, Indianapolis, is the architect. The plans for the Wilde Bank Building, Indianapolis, have not been completed, but will be out shortly. There will be very little change in plant operations during the week. The jobbing mills of the American Rolling Mill Co. will be idle, although the Eastside works will be running at about 60 per cent. The Zanesville Works are continuing on a 50 per cent basis. Whitaker-Glessner Works at Portsmouth, is on a 40 per cent basis and improvement is being shown at the plant of the Newport Rolling Mill Co. at Newport, Ky., where a strike is in progress. The Louisville & Nashville Railroad has closed for 11,700 kegs of spikes with a Pittsburgh mill at \$2.15 per keg.

Warehouse Business.—During the past few days, local jobbers report a very healthy improvement in business and the sales made are entirely satisfactory. Local jobbers have reduced prices on steel bars, shapes, plates, cold rolled, and hoops and bands, \$3 a ton. Prices on sheets remain unchanged. Prices on wire

products were recently reduced \$3 a ton. The new prices follow:

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.00 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Coke.—Some activity in the coke market was reported and some contracting is going on, but usually in small amounts. A local sales agent booked one order for 2000 tons, one for 1500, and one for 1200, for delivery during the year. Prices are unchanged.

Old Material.—Very little activity is reported in the scrap market. A pipe company in this district is reported to have bought some cast scrap at the current market, but with this exception the market was quiet, and ruling quotations are unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	\$3.50 to \$4.00
Iron rails	12.00 to 12.50
Relaying rails, 60 lb. and up.	25.00 to 26.00
Re-rolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axles	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Philadelphia

PHILADELPHIA, Jan. 17.

A slight improvement in demand for steel and pig iron has developed within the past week, but the change for the better is so small that it is yet too early to say whether it is the beginning of a gradually broadening business. Singularly, the betterment has been noted mostly in plates, which have suffered from lack of demand more than any steel product. One Eastern plate mill last week did the best business in many weeks. The Alan Wood Iron & Steel Co. is able this week to start its plate mill, which has been idle for some time, on a two or three weeks' schedule. In pig iron the better demand is not notable, but is indicated chiefly by a larger number of small inquiries. The tendency of all consumers to buy in very meager lots is probably due partly to the imminence of the Interstate Commerce Commission hearings on iron and steel freight rates, scheduled to be held next Saturday and Monday in Washington. That a possible reduction in freight rates is not considered by all buyers, however, is shown by a few inquiries which have come out for second quarter iron requirements. In fact, one or two second quarter sales have been made.

Although pig iron prices remain firm, steel business is being done very largely at the expense of prices. Some of the Eastern steel companies are adhering rigidly to 1.50c., Pittsburgh, on plates, shapes and bars, but 1.40c., Pittsburgh, has been done on plates, when the tonnages were attractive, and 1.45c. is comparatively easy on all three products. Bar iron is also offered now at 1.45c., Pittsburgh, a reduction of \$1 a ton. Shafting and screw stock is weak at 1.90c., Pittsburgh, with reports of sales as low as 1.75c. Sheets are holding firmly, except that some plate mills are offering heavier gages of blue annealed at \$1 or \$2 a ton below the 2.25c. quotation of regular blue-annealed makers.

The Interstate Commerce Commission has ordered an increase of 20c. per net ton in the freight rate on finished steel from Pittsburgh to Philadelphia, the new rate being 0.36c. instead of 0.35c. per lb. The Baltimore rate, which was 0.335c. per lb., is increased to 0.35c. The change is made to re-establish the relationship which existed in rates from Pittsburgh to Eastern points prior to the 40 per cent rate advance in August, 1919.

Pig Iron.—A few inquiries for foundry iron for second quarter constitute the only new feature of the

local pig iron market. While some furnaces are still averse to selling that far ahead, others are willing to quote, and have done so, their prices being practically the same as those for first quarter. A different situation exists, however, in regard to quoting on 75,000 tons of iron required for the cast iron segments for the New York-New Jersey vehicular tunnel. Practically all of the Eastern furnaces have been asked by various contractors to bid on the iron, but with one or two exceptions the furnaces are not willing to do so, at least not on a basis that would be satisfactory to the bidding contractors. The deliveries will extend over two years, at about 3000 tons a month, and some furnace operators fear they are standing too great a chance of loss to take business over such a long period at to-day's prices. Furnaces in this district are adhering to \$20, furnace, for No. 2 plain, \$20.50 for No. 2X and \$21 for No. 1X, except that concessions of about 50c. a ton have been made in some instances to equalize freight rates, the same furnaces, however, quoting their regular prices where they encounter no freight rate disadvantage. A northern New Jersey melter bought 500 tons of No. 2X at \$21, delivered, but the freight rate was only 70c. A New England melter is reported to have bought 1000 tons from an eastern Pennsylvania furnace for second quarter shipment. An inquiry for 800 tons of foundry grades for second quarter is in the market, also an inquiry for 250 to 500 tons of gray forge. Most of the current inquiries are for small lots, but the number of these inquiries is greater than in the week previous.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.84 to \$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.24 to 27.74
Virginia No. 2X, 2.25 to 2.75 sil.	27.74 to 28.24
Basic delivery eastern Pa.	20.25
Gray forge	20.50 to 21.50
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—The Jones & Laughlin Steel Co., Pittsburgh, has bought 20,000 tons of Brazilian manganese ore at 22c. per unit, Atlantic seaboard, and will make its own ferromanganese. This is the first important sale of manganese ore in some time. Ferromanganese is still quoted by Eastern producers and the British selling agents at \$58.35, seaboard. A steel company in the Chicago district imported British alloy at \$58.35, New Orleans, the delivered price at its mill being below the Steel Corporation quotation of \$60, Pittsburgh. Spiegeleisen is quoted at \$25, furnace, and some sales have been made below that figure.

Rails.—The Southern Railway will receive bids up to Friday, Jan. 20, on 26,600 tons of 85-lb. rail and 8500 tons of 100-lb. rail; also on 18,000 rail joints.

Billets.—Open-hearth re-rolling billets are now quoted freely at \$28, Pittsburgh, and forging billets at \$32, Pittsburgh. There are few sales.

Plates.—Boiler manufacturers on the Great Lakes have placed orders in the past week for boiler plate for stock, it probably being their intention to build boilers now for the spring fitting out of lake vessels. This business has helped out one Eastern plate mill to a considerable extent, the company counting its last week's business as the best in some time. Plate prices are weak, and though most of the mills quote 1.50c., Pittsburgh, some adhering rigidly to this price, others have accepted attractive lots as low as 1.40c., while 1.45c. is rather a common figure on current business. The Cramp shipyard has inquired for about 6000 tons of plates.

Structural Material.—The largest structural job awarded in Philadelphia recently is the Museum of Art building, requiring 2700 tons of steel, which was awarded to the American Bridge Co. Plain material is quoted at 1.50c., Pittsburgh, but this price is sometimes shaded \$1 or \$2 a ton on attractive business.

Bars.—To meet quotations of 1.45c. on steel bars, now a rather common figure, iron bar makers have also reduced their price to 1.45c., Pittsburgh. A slightly better demand for steel bars has been noted in the

past week. Cold-finished bars are quoted at 1.90c., Pittsburgh, but this has been shaded, it is reported, as much as \$3 a ton.

Sheets.—Except for slight cutting by plate mills on heavy blue annealed sheets, the sheet prices appear to be held firmly. The concessions on blue annealed are usually \$1 or \$2 a ton. Regular makers of blue annealed adhere to 2.25c., Pittsburgh, and black and galvanized are firm at 3c. and 4c., respectively, base, Pittsburgh.

Bolts, Nuts and Rivets.—About 45,000 kegs of bolts will be required for the New York-New Jersey vehicular tunnel. Bids have been asked for by contractors who are submitting tenders on the work. The Cramp shipyard is inquiring for 325 tons of rivets and 330 tons of high tensile steel material. The Philadelphia & Reading Railroad has bought 500 kegs of structural rivets at 2.05c., Pittsburgh, a new low figure. It also bought 300 kegs of hot-pressed nuts and is in the market for a quantity of bolts.

Warehouse Business.—We quote steel out of stock from Philadelphia warehouses as follows, prices including delivery within the city of Philadelphia.

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼ in., 4.60c.; 3/16-in., 4.785c.; ½ in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.10c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—Scrap prices are largely nominal, there being few transactions. An eastern Pennsylvania steel company has bought 1000 tons of heavy melting steel at \$11.50, delivered, and another plant has taken 500 tons of a slightly better quality at \$12, delivered. A Delaware steel plant has bought 500 tons or more of cast iron borings at \$12.50, delivered. We quote re-rolling rails at \$15.50 to \$16, delivered. Quotations for delivery at consumers' works in this district are as follows:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Scrap rail.....	11.50 to 12.00
Steel rails, re-rolling.....	15.50 to 16.00
No. 1 low phos., heavy 0.01 and under	17.00 to 18.00
Car wheels.....	16.50 to 17.00
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.00 to 12.50
No. 1 forge fire.....	10.00 to 10.50
Bundled sheets (for steel works)....	9.50 to 10.00
No. 1 busheling.....	11.00 to 12.00
No. 2 busheling.....	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use).....	9.00 to 9.50
Mixed borings and turnings (for blast furnace use).....	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use).....	9.00 to 9.50
Heavy axle turnings (or equivalent).....	9.50 to 10.00
Cast borings (for steel works and rolling mills).....	12.00 to 12.50
Cast borings (for chemical plants)....	13.50 to 14.00
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	14.00 to 14.50
Stove plate (for steel plant use).....	14.00 to 14.50
Railroad malleable.....	13.50 to 14.00
Wrought iron and soft steel phos and tubes (new specifications).....	11.50 to 12.00
Iron car axles.....	No market
Steel car axles.....	17.00 to 18.00

San Francisco

SAN FRANCISCO, Jan. 11.

Pig Iron.—Since the pre-holiday period, this market has continued dull, and not yet is there an apparent sign of substantial recovery in demand. No new business of any consequence has developed, with the exception of an inquiry for 350 tons of foundry pig iron, which the Southern Pacific Co. has closed. This material is of standard quality, 1.75 to 2.25 silicon. It appears that buyers had pretty liberally stocked during November and December, when prices were attractive, and now with no outstanding demand for fabricated products, have no occasion to purchase iron in conspicuous quantities. A steady business is being done for consumptive purposes, but this involves small amounts. The market appears about steady at prevailing prices, which are in the neighborhood of \$27

to \$30, ex ship, San Francisco, for the various qualities. The steamer Theodore Roosevelt recently delivered about 2000 tons to this port from Belgian shipping points, the iron having been sold some time ago. It is reported that there is a little demand for pig iron at Los Angeles, and Portland is said to be in the market for approximately 1000 tons.

Cast Iron Pipe.—After the period of good activity in November and the early part of December, business in pipe has quieted down, both from municipal and private sources. New business has been very light since Christmas. There has also been a slight softening tendency in prices, the market being estimated at around \$32 base, with lower figures occasionally being reported. The city of Calexico, Cal., is in the market for 70 tons of pipe, and Monterey Park near Los Angeles has voted \$225,000 bonds for a water system in which some pipe will be used. Newport Beach irrigation district will be authorized to call for bids on Jan. 11, to be received later, for the construction of a pipe line 9800 lineal ft. of cast iron 12-in. pipe.

Finished Iron and Steel.—Thus far, the new year has not brought any indications of betterment in the Coast steel business. Possibly it is a little early yet to expect much, as jobbers and consumers are still concerned with inventories. There seems to be a hopeful feeling in the trade, it being the expectation that a few weeks will witness a marked improvement in demand. At the beginning of the year, the larger steel interests announced a 10c. reduction in prices of reinforcing and merchant bars, the former now being quoted at \$2.75, San Francisco, while the latter is held at \$2.65. There has been little interest in other lines, and prices are still unsettled, but appear to be steady. Galvanized sheets are around 4c., Pittsburgh, and plates range from \$1.70 to \$1.75, tidewater. A few small jobs are pending, which will call for small quantities of mixed materials, and there is also reported a little inquiry for rails, but the most conspicuous prospect is the State Harbor Commission's warehouse to be erected at San Francisco, the bids for materials opening Jan. 12. For the first unit between 800 and 1000 tons of reinforcing bars will be needed.

Coke.—There is a fair business in coke on the Coast at present, the most notable single order coming from the Southern Pacific Co., which has just closed for 600 tons of foundry material. Smelters continue to be steady takers, and it is reported that about 2000 tons are en route from foreign points. Estimates place the delivery of English coke to smelters, covering a past period of three months, at approximately 4500 tons. The current market price on foreign material is ruling about \$18 ex ship, San Francisco.

Old Material.—Cast iron scrap is said to be scarcer and prices have advanced a little, as high as \$23 a net ton, delivered at foundry, being heard. Movement is not considerable, however, the demand being confined to small lots. Heavy melting steel is quite liberally offered at approximately \$10 a gross ton, but there is very little consumptive demand, as rolling mill activity is at a minimum. The supply on the Coast has been augmented somewhat by the scrapping of the cruiser Brooklyn.

The Barrett Adding Machine Co. has sold its business, patents and other assets to the Lanston Monotype Machine Co., Philadelphia. The purchasing company manufactures the monotype, a composing machine for printers. The Barrett machine, it is pointed out, can be manufactured by machines, methods and men identical with those necessary to the manufacture of the monotype keyboard.

The regular monthly meeting of the Cleveland Purchasing Agents' Association will be held Thursday, Jan. 19, at the Hotel Statler, Cleveland. The speakers of the evening will be C. W. Chabot and W. S. Epply of the Hamermill Paper Co., Erie, Pa.

The Pennsylvania Equipment Co., 1420 Chestnut Street, Philadelphia, is in the market for 50 16 to 20-cu. yd. capacity second-hand dump cars.

EXPORT ACTIVITY SPREADS

Inquiries Reported From South America and Mediterranean Markets—Chili Asks Railroad Equipment Bids

NEW YORK, Jan. 17.—Export sales have slightly diminished in volume, but exporters to other markets than the Far East report a renewed interest from South America and Mediterranean countries for finished material. Despite numerous reports to the contrary, German competition is still handicapped by inability to supply the demand for iron and steel, but there are prospects that many German mills may have cleared their books by the second quarter of the year. The New York representative of a large German interest was recently offered an allotment of heavy rails at the rate of 1000 tons per month, beginning with a May shipment. This offer was made with the provision that an export license be obtainable at that time from the government. Rails and equipment are at present greatly needed by the German railroads and the government may not be inclined to permit export shipments of this material. Part of the present congestion of transportation lines in Germany is said to be caused by the large number of empty freight cars distributed over the lines and which cannot be properly handled.

The inability of German agents in the United States to obtain material, except in unusual circumstances, is marked. Recently the representative of a large interest inquired of other German representatives for about 200 tons of billets, but thus far has been unable to obtain them from this source. An extremely satisfactory pipe inquiry from the South is reported to have been lost by several German representatives because of inability to obtain material.

German competition in machine tools and machinery is reported to be stronger and some firms

are seeking representation in the United States. It is reported from Spain that the Minister of War has awarded a contract for machine tools and other equipment for an arsenal to the value of about 40,000,000 pesetas (about \$6,000,000) to German manufacturers. The arsenal is believed to be near Madrid and the equipment is in line with the Spanish Government's intention of prosecuting the Moroccan campaign with renewed vigor. There were some bids submitted by American sellers of machine tools.

The Canadian Pacific Railway, it is said, is considering the appropriation of about \$25,000,000 for road extensions and other improvements during the current year, most of the work to be done on western lines.

The Waterloo Chemical Works, Sydney, New South Wales, will probably establish a plant at Hobart, Tasmania, for the electrolytic manufacture of pigments from scrap iron, according to the trade supplement of the *Times*, London. The removal of the company's plant from Sydney to Hobart, will be undertaken because of the cheap hydroelectric power available at the latter place.

A group of hydroelectric companies is contemplated near St. Etienne and Grenoble in France, the group to operate under the name of the Societe de Transport d'Energie du Centre. Four main lines of transmission will be constructed, two within the next four years. They will be of 50 cycles, 10,000 to 150,000 volts.

The Department de Materiales y Almacenes, Alameda Station, Santiago, Chile, has issued specifications for bids on the following equipment for the Chilean State Railways: Cars (23), boilers, electric machinery, lamps, etc., tin and lead in ingots, bars, iron and steel tubes, bids to be opened Feb. 4, in Santiago. On Feb. 16, bids will be opened in Santiago on a tonnage of fish-plates and chairs for rails. Bids have been placed in the hands of British sellers through the British Legation in Chile and have been issued to American makers through the office of the Chilean State Railways, 141 Broadway, New York.

British Iron and Steel Market

Drastic Price Cuts in Pig Iron and in Steel Have Virtually Stopped Continental Competition—Sheets and Tin Plate Weaker

(By Cable)

LONDON, ENGLAND, Jan. 17.

Cleveland pig iron prices have been reduced. Two additional furnaces have been blown in. The position looks brighter, as there is a fair amount of inquiry for both home and export business. Continental competition has now virtually ceased. Hematite is more active, as Wales and Sheffield are buying. There is some expert inquiry, for which iron makers are competing keenly. Prices are falling.

Foreign ore is quiet. Bilbao Rubio is held at 26½s. (\$5.59) ex-ship, Tees. Germany is negotiating for large Newfoundland contracts.

Durham coke is weak.

Cheap sellers of English finished steel have shown an inclination to stiffen prices as their order books fill up. Most English makers of plates and angles refuse concessions. Scottish works, generally, are resuming operations this week.

Continental business is slow, owing to delays in shipments. Belgian merchant bars are quoted at £7 10s. to £7 15s. (1.41 to 1.46c. per lb.) f.o.b., for March and April delivery. Belgian ¼-in. plates are being held at £8 (1.52c. per lb.) f.o.b., March and April. Belgian beams are quoted at £9 14s. (1.83c. per lb.) delivered, Midlands.

German ¼-in. plates are quoted at £7 15s. to £8 (1.46 to 1.52c. per lb.) f.o.b., March and April shipment.

German wire rods are held at £8 15s. (\$36.93) f.o.b., for March and April.

Continental basic pig iron is not quoted. Foundry pig iron is held at 100s. (\$21.10) f.o.b.

Tin plate in prompt position is easier, due to the fall in price of sheet bars. As the demand is not sufficient to absorb current output, some mills have already ceased rolling. There is a fair export business. Japan and the Far East are inquiring. Domestic buyers are purchasing odd sizes.

Galvanized sheets are weaker. There is some demand from India, South America and the Far East, but prices are still above buyers' ideas.

France is buying good quantities of black sheets. The Far East is inquiring, but little business is moving.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.22 per £1 as follows:

Durham coke, delivered..	£1 5s. to £1 7s.	\$5.28 to \$5.70
Cleveland No. 1 foundry..	4 15	20.05
Cleveland No. 3 foundry..	4 10	18.99
Cleveland No. 4 foundry..	4 7½	18.46
Cleveland No. 4 forge....	4 10	18.99
Hematite	7 0*	29.54*
East Coast mixed.....	4 15 to 4 17½	20.05 to 20.57
Permanganose	15 0 to 14 10*	63.30 & 61.19*
Halls, 60 lb. and up.....	8 0 to 9 10	33.76 to 40.69
Billets	7 10 to 7 15	31.65 to 32.71
Sheet and tin plate bars.		
Welsh	7 5 to 7 7½	30.80 to 31.12
Tin plate, base box.....	0 19½ to 0 19½	4.06 to 4.17
		C. per Lb.
Ship plates	9 0 to 10 10	1.70 to 1.98
Boiler plates	12 10 to 14 0	2.35 to 2.64
Tees	9 10 to 11 0	1.79 to 2.07
Channels	8 15 to 10 5	1.65 to 1.98
Beams	8 5 to 10 0	1.55 to 1.88
Round bars, ½ to 3 in... 10 10		1.98
Galvanized sheets, 24 g.. 16 0	to 16 5	3.01 to 3.06
Black sheets	13 0	2.45
Steel hoops	12 0	2.26 & 2.31*
Cold rolled steel strip, 20 g. 24 5		4.57

*Export price.

PERSONAL

Roland Gerry, a director of the Jones & Laughlin Steel Co., and manager of sales of the cold-rolled department, has been advanced to the position of special



ROLAND GERRY



WILLIAM B. TODD

sales representative of the company for the United States and Canada, effective Feb. 1. Mr. Gerry will be succeeded by William B. Todd, at present vice-president of the Union Drawn Steel Co., Beaver Falls, Pa. Mr. Gerry has been with the company 41 years, rising through the sales department in successive grades to the new and responsible position he is about to occupy. Mr. Todd has been with the Union Drawn Steel Co. for 20 years, having entered its employ through the mill office in 1901 and been advanced through various departments to the vice-presidency. Mr. Todd attended the public schools of Beaver Falls and later Geneva College, a member of the following clubs and associations in Beaver Falls, Pittsburgh, Philadelphia and New York: The Tamaque Club, the Kiwanis Club, the Union Club, the Traffic Club, the Beaver Valley Club, of which he is president; the Society of Automotive Engineers, American Iron and Steel Institute, secretary of the Manufacturers Association of Beaver County and a member of the executive committee of the Pennsylvania Manufacturers Association.

George H. Mueller has become associated with the Pawling & Harnischfeger Co., Milwaukee, Wis., manufacturer of electric cranes, machine tools and excavating machinery. For a time Mr. Mueller will devote his attention to the study of the company's sales promotion and organization problems, after which he will take over the direction of the company's sales department as general sales manager. Mr. Mueller is an engineer and a graduate of Purdue and Cornell universities. For about five years he was identified directly and indirectly with the Link Belt Machinery Co., Chicago, as engineer, salesman, and district representative. In 1906 he became connected with the Jeffrey Mfg. Co., Columbus, Ohio, with which organization he was chief engineer, assistant sales manager, and New York manager, over 11 years. In the early part of 1917 he joined the Curtiss Aeroplane & Motor Corporation, Buffalo, where he served as managing engineer during the war. In 1919 he became identified with the J. I. Case Plow Works Co., Racine, Wis., as manager of service. Just before joining the Pawling & Harnischfeger organization Mr. Mueller was receiver for a plant manufacturing gas engines and gas engine-driven machinery.

F. M. Feiker, who went to Washington eight months ago as assistant to Secretary of Commerce Hoover on leave of absence from the McGraw-Hill Co., New York, has resigned, the Department of Commerce announces. Mr. Feiker has been appointed a special agent of the Bureau of Foreign and Domestic Commerce to continue in a consulting capacity the work that he has been

doing in reorganizing the work of the department in its contacts with business.

O. H. Wharton, vice-president in charge of sales and also a director the Crucible Steel Co. of America, has resigned.

J. N. Klock has been elected president of the Auto Machine Co., Holland, Mich.; W. J. Banyon, vice-president; H. S. Gray, secretary; R. C. Easley, treasurer and general manager.

C. R. Scarborough, New York, president Home Sewing Machine Co., Orange, Mass., and Harvey S. Dawley, treasurer, have retired, and have been succeeded by DeForest Candee.

C. A. Pfeffer has resigned as president of the Saxon Motor Car Co., Detroit, with which organization he has been connected for three years.

J. R. Blakeslee, president Ajax Mfg. Co., forging machinery, Cleveland, has sailed for Europe on a two months' business trip.

Henry B. Plumb, New York, treasurer Eagle Lock Co., Terryville, Conn., has been elected president of that company to succeed his brother, the late Rollin J. Plumb.

Robert H. Spahr, director of education Winchester Repeating Arms Co., New Haven, Conn., has been made instructor in foremanship of the Springfield, Mass., division, Northeastern University.

John D. Hibbard has resigned as commissioner of the National Metal Trades Association, with headquarters at Chicago. The resignation was accepted by the



HOMER D. SAYRE



JOHN D. HIBBARD

executive committee at the request of Mr. Hibbard, who desired to be relieved of the responsibilities of the office at this time. He has been commissioner since December, 1912, when he succeeded Robert Wuest. During his term of office the membership of the association has grown from 732 to 1013. Mr. Hibbard will continue to be identified with the association in an advisory capacity. Homer D. Sayre, secretary, has been appointed commissioner to succeed Mr. Hibbard. A graduate of the law school of DePaul University, Chicago, Mr. Sayre has been with the National Metal Trades Association in various positions since March, 1907. Louis W. Fischer has been appointed secretary to take the place made vacant by Mr. Sayre's promotion. Mr. Fischer has been with the association for three years and prior to that had both legal and business training. A graduate of the law school of DePaul University, Chicago, he was for six years assistant to the judge of the Appellate Court for the First District of Illinois, at Chicago.

Charles E. Stuart, secretary and treasurer Central Steel Co., Massillon, Ohio, has been elected president of the Massillon Chamber of Commerce. Among other new officers of the chamber are E. H. Nelson, general manager Griscom-Russell Co., who was named first vice-president, and E. H. Birney, president Peerless Drawn Steel Co., who was elected second vice-president.

C. C. Upham, formerly vice-president Diebold Safe

& Lock Co., Canton, Ohio, has been elected chairman of the board of directors of that company and in his new capacity has assumed active management of the company's affairs.

Roy D. Tyler, a specialist on indoor transportation systems, became associated with the Standard Conveyor Co. of North St. Paul, Minn., recently. For seven years he had been with Montgomery Ward & Co. as engineer of construction and equipment of all plants and general superintendent of the Chicago plant.

H. W. Cross, formerly of the General Electric Co., has assumed management of the New England office at 53 State Street, Boston, of the C. H. Wheeler Mfg. Co., condensers, pumps and cooling towers, Philadelphia.

C. H. Davies has severed his connection with the S. F. Bowser Pump & Tank Co., with whom he has been associated for 16 years. For many years he was advertising manager and was editor of its house organ. Until recently he was in charge of the promotion of factory sales, with headquarters in Chicago. Mr. Davies has already taken up his new duties with the Citrus Products Co., Chicago, and will be in charge of advertising and marketing.

F. A. Coleman, who has been engaged in the design and manufacture of foundry equipment for the past 17 years, recently resigned as vice-president and general manager of the Foundry Equipment Co., Cleveland. He is now located at 1951 East Fifty-seventh Street, Cleveland.

L. A. de Marrais, who was formerly with J. N. Kinney, 30 Church Street, New York, is now in charge of sales of Ohio locomotive cranes and electric cranes of the Bedford Foundry & Machine Co., for J. N. Kinney.

E. G. Howell, assistant treasurer and assistant to the general manager in the sales department, Briggs & Turivas, Inc., scrap iron and steel broker, Chicago, has resigned to join the sales force of Hickman, Williams & Co., dealers in pig iron, alloys and scrap, Chicago. Mr. Howell was with Briggs & Turivas, Inc., for three and one-half years, and prior to that time was for 14 years connected with the Republic Iron & Steel Co. C. M. Stowe, who recently resigned from the sales force of Hickman, Williams & Co., has become identified with the Holland Furnace Co., Holland, Mich., and will be assigned to that company's Cedar Rapids, Iowa, plant. The position left vacant by Mr. Howell at the Briggs & Turivas offices will be filled by Frank Garrett, who has been connected with the company for five years in an outside capacity.

Zeno D. Barns has been appointed manager of the Cleveland office, 429 Schofield Building, of the Ajax Metal Co., Philadelphia, succeeding the late Louis E. Purnell. The Cleveland office covers the states of Ohio and Michigan. Mr. Barns for some years past has been connected with the Westinghouse Electric & Mfg. Co. and the Westinghouse Air Brake Co.

Edward Francis Carry, president Haskell-Barker Car Co., Michigan City, Ind., recently purchased by the Pullman Co., was made president of the combined concern on Jan. 16. J. S. Runnels, retiring president of the Pullman Co., becomes chairman of the board. Mr. Carry started his car building career at the age of 21, as stenographer for Wells & French.

were at that time the pioneer manufacturers of wood-working machinery in the United States. He had been employed in their shop but two weeks when an accident caused him to lose his left arm and he was then transferred to a position in the office. Later Mr. Egan became a traveling salesman for the company. In 1884 Mr. Egan resigned and, with several associates, engaged in business for himself. The enterprise was successful and the firm soon moved into a plant on Front Street, between Central Avenue and John Street. Several years later the Egan company was organized, with a capital stock of \$150,000, with Mr. Egan as president. In 1893 the Egan company was consolidated with the J. A. Fay Co. with a capitalization of \$2,500,000 and Mr. Egan was elected president of the consolidated companies. The concern grew steadily until now it is considered to be the largest woodworking machinery plant in the world. Mr. Egan was one of the organizers of the National Association of Manufacturers and was its first president. He was signally honored at the meeting of this association held in New York last year. He was also the organizer of the Manufacturers Club of Cincinnati, and was a one-time president of the Chamber of Commerce of Cincinnati. Mr. Egan is survived by his wife and seven children; three sons and four daughters. All of the sons are engaged in the business founded by their father.

JOHN J. CUNNINGHAM, president and general manager Western Foundry Co., Wingham, Ont., died in Toronto recently. The deceased was well known in western Ontario and had been prominent in the manufacture of stoves for a number of years.

T. C. DILL, president T. C. Dill Machine Co., Inc., Philadelphia, died Jan. 6 of heart trouble.

ALBERT B. COATES, Coates & Tweed, Lake Superior iron ore mine owners, died Jan. 10 in Orlando, Fla., at the age of 52. His home was at Virginia, Minn. He was born in Cleveland and early in life became bookkeeper for the Avery Stamping Co., which position he left to go to Minnesota as office head for Frank Rockefeller. Coates & Tweed own mines in the Mesaba, Cuyuna and Gogebic ranges, their ore being marketed through Pickands, Mather & Co., Cleveland.

ARTHUR SEYMOUR BROWN, vice-president Ansonia branch of the American Brass Co., died Jan. 12 at his home of heart failure, at the age of 44 years.

JAMES A. BRADY, founder and until his retirement president and general manager of the James A. Brady Foundry Co., Chicago, died at his home in that city on Jan. 9, following an illness of one month. Mr. Brady was 74 years of age and was born in Jersey City, N. J. He spent his early life in New York, where he was identified with the Tammany organization under the Croker regime. At the age of 25 he became connected with the foundry business at Beaver Falls, Pa. Subsequently he went to Chicago, where for 13 years he was superintendent of the foundry of the Chicago Hardware Mfg. Co., now the Chicago Hardware Foundry Co. After leaving that company he was for seven years superintendent of the Reedy Elevator Works, now the Reedy Foundry Co., Chicago. In March, 1899, he organized the James A. Brady Foundry Co., Chicago, of which he was president and general manager up to the time of his retirement from business some ten years ago.

HENRY BARTON, superintendent of the foundry operated by the Henry E. Pridmore Co., Chicago, manufacturer of molding machines, died at his home in that city on Jan. 4. He was 61 years of age and his death was caused by heart disease.

GEORGE BALDWIN SELDEN, holder of the famous Selden patents covering gasoline propelled vehicles and a pioneer in the present automotive industry, died at Rochester, N. Y., Jan. 17, at the age of 77 years. He was president of the Selden Motor Co., Rochester. He was graduated from Yale University in 1865, studied law and was admitted to the bar in 1871. In 1879 he applied for a patent on his gasoline engine after a few years of experimenting with other fuels.

OBITUARY

THOMAS P. EGAN, president J. A. Fay & Egan Co., manufacturer of woodworking machinery, Cincinnati, died at the Good Samaritan Hospital in that city on Jan. 9, aged 74 years. He was born in Ireland and during his infancy was brought to Canada, where he attended high school. He went to Cincinnati in the early sixties where he obtained employment as a lathe hand in a brass manufacturing concern. Soon he entered the service of Steptoe-MacFarland & Co., who

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Straits Tin		Lead		Zinc	
Jan.	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
11.....	13.87½	13.62½	32.37½	4.70	4.40	5.12½	4.77½
12.....	13.87½	13.62½	33.00	4.70	4.40	5.10	4.75
13.....	13.87½	13.62½	33.00	4.70	4.40	5.10	4.75
14.....	13.87½	13.62½	.....	4.70	4.40	5.10	4.75
16.....	13.87½	13.62½	32.37½	4.70	4.40	5.12½	4.77½
17.....	13.87½	13.62½	32.00	4.70	4.40	5.12½	4.77½

*Refinery quotation

New York

NEW YORK, Jan. 17.

Dullness still pervades all the markets. Buying is light but most quotations are steady. Business in tin continues moderate but prices are slightly higher. There is no change in conditions in the lead market but prices are firm. Demand for zinc is very light with but little change in quotations. Antimony is lower.

Copper.—Interest on the part of consumers is exceedingly light and needs for a large part of the first quarter were fully covered in the latter part of last year. There is some demand for electrolytic copper, but it is confined to the immediate needs of a few consumers here and there. The price situation is generally firm. Quotations of the leading producers are at the minimum of 13.87½c., delivered, or 13.62½c., refinery, for January and first quarter, with 14c., delivered, the minimum asking price of some of the larger producers. There are also some refiners of copper who are out of the market. It is stated that a few dealers are offering electrolytic copper at 13.75c., delivered, or 13.50c., refinery, but the amount available from this source is exceedingly small. Lake copper is quoted at 13.87½c., New York or delivered, with that market also quiet.

Tin.—The market for spot Straits tin is spotty. On Jan. 11 and 12 there was some activity, due to the report that the steamer Sagadahoc, with 1000 tons of Straits tin aboard, had met with an accident and was obliged to put into port for repairs, which would necessitate a delay of a month in its arrival here. This caused some fear of a shortage of tin in January and February, resulting in dealers turning buyers; on those days fairly large sales were made, estimated to amount to between 400 and 600 tons. A little business was done on Jan. 13 and yesterday pressure to sell developed which resulted in an easier market. There were sales of spot and metal on steamers afloat at 32.37½c. and some later deliveries were done at 32.25c. to 32.12½c., the total business amounting to 200 to 250 tons. Today dealers turned buyers and the market was active and firm. On the New York Metal Exchange on Jan. 12, January shipment from the Straits, 25 tons, was sold at 33c. and 25 tons of spot standard at 32.50c. Spot Straits tin to-day was quoted at 32c. New York, and the London market was about £2 per ton lower than a week ago at £163 7s. 6d for spot standard, £165 for future standard and £165 7s. 6d. for spot Straits, with the market weak. Arrivals thus far this month have been 3015 tons with 5410 tons reported afloat.

Lead.—The market is firm and unchanged at 4.70c., both New York and St. Louis, as the quotation of the leading interest and with 4.40c. St. Louis, and 4.70c. to 4.75c., New York and Eastern points, as that of the outside market. New demand is fair but not large enough to affect prices.

Zinc.—The market is quiet and dull and demand still waits upon developments in the steel market, particularly demand for galvanized sheets. Spot and early delivery for prime Western zinc is quoted at 4.75c. to 4.80c., St. Louis, or 5.10c. to 5.15c., New York, with future business in the first quarter about five points higher for each month involved.

Antimony.—Wholesale lots for early delivery are slightly lower at 4.45c., New York, duty paid.

Aluminum.—The quotation of the leading interest for wholesale lots for early delivery continues unchanged at 19.10c. per lb., f.o.b. plant, for 15-ton lots of virgin metal, 98 to 99 per cent pure, but the same grade is obtainable from importers handling Norwegian, Swiss, British, German and Swedish metal at 17c. to 18c., New York, duty paid. There is an inquiry for 200 tons before the market.

Old Metals.—Business is still dull, but there is a better feeling in the market. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.25
Copper, heavy and wire.....	12.50
Copper, light and bottoms.....	10.00
Heavy machine composition.....	10.25
Brass, heavy.....	8.00
Brass, light.....	6.00
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy.....	4.25
Lead, ten.....	3.25
Zinc.....	3.00

Chicago

JAN. 17.—No duller week has been seen in years in the metals, with buying practically at zero. Old metals are slightly lower in the absence of trading and dealers find nothing moving. We quote in carload lots: Lake copper, 14c.; tin, 33.50c.; lead, 4.50c.; spelter, 4.80c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.75c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

JAN. 17.—The market for lead and zinc is slightly weaker. We quote lead at 4.38c. to 4.40c., car lots, and slab zinc at 4.75c. to 4.80c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Transfer of Jamison Coke Properties

PITTSBURGH, Jan. 16.—Official announcement of the successful conclusion of negotiations for the transfer of the Greensburg, Pa., properties of the Jamison Coal & Coke Co., to the Keystone Coal & Coke Co., was made last Saturday by Harry F. Bovard, general superintendent of the latter. All of the Jamison Coal & Coke Co. holdings in Westmoreland county, except the new mining operations on the Thaw estate at Pleasant Unity, are involved in the transaction, which gives the Keystone company undisputed control of the Greensburg basis, since the company, by the Jamison purchase, controls all the output of the basin except one or two small mines. Besides the Thaw operations retained in Westmoreland county, the Jamison company still owns two mines at Perryopolis, Pa., and 8000 acres of Pittsburgh seam coal near Fairmount, W. Va.

The formal transfer of the properties of the Jamison company will be made on Feb. 1. The principal mines which are involved are the Jamison No. 1 at Luxor, employing 350 men and producing annually 380,000 tons of coal and operating 400 beehive coke ovens; the Jamison No. 2, at Hannastown, employing 600 men and producing 440,000 tons; the Jamison No. 3, at Forbes Road, employing 325 men and producing 370,000 tons; the Jamison No. 4, at Crabtree, employing 663 men and producing 679,000 tons and operating 492 coke ovens; the Jamison No. 5, at Crabtree, employing 700 men and producing 380,000 tons, and the Jamison No. 6, near Greensburg, employing 200 men and producing 130,000 tons. The officers of the Keystone company are: President, Julian B. Huff; general superintendent, Harry F. Bovard, and directors, Messrs. Huff and Bovard, William A. Coulter, W. S. Moorhead, Richard Coulter and E. M. Gross.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic..\$0.85	Kansas City	\$0.815
Philadelphia, export... 0.285	Kansas City (pipe)...	0.77
Baltimore, domestic... 0.335	St. Paul	0.665
Baltimore, export	Omaha	0.815
New York, domestic... 0.38	Omaha (pipe)	0.77
New York, export..... 0.285	Denver	1.35
Boston, domestic	Denver (wire products)	1.415
Boston, export	Pacific Coast	1.665
Buffalo	Pacific Coast, ship plates	1.335
Cleveland	Birmingham	0.765
Detroit	Jacksonville, all rail..	0.555
Cincinnati	Jacksonville, rail and	
Indianapolis	water	0.46
Chicago	New Orleans	0.515
St. Louis		0.475

The minimum carload to most of the foregoing points is 86,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, 1/4 in. and heavier, tank quality, 1.50c.

Wire Products

Wire nails, \$2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.15; galvanized fence staples, \$3.15; painted barbed wire, \$2.65; polished fence staples, \$2.65; cement-coated nails, per count keg, \$2.00; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70 1/2 per cent off list for carload lots; 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7 1/2 per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, 1/2 in. x 6 in.;
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list

Cut threads 65 and 10 to 70 per cent off list || Longer and larger sizes..... | 65 and 10 to 70 per cent off list |
Lag bolts	70 and 10 to 70, 10 and 5 per cent off list
Flow bolts, Nos. 1, 2 and 3 heads.....	60 and 10 per cent off list
Other style heads	20 per cent extra

Machine bolts, c.p.c. and t. nuts, 1/2 in. x 4 in.;
Smaller and shorter..... 65 and 5 per cent off list
Larger and longer sizes..... 65 per cent off list
Hot pressed sq. or hex. blank nuts..... \$5.50 off list
Hot pressed nuts, tapped..... \$5.00 to \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts..... \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped..... \$5.00 off list
Semi-finished hex. nuts:

1/4 in. to 9/16 in. inclusive..... 80, 10 and 10 per cent off list
Small sizes S. A. E..... 80, 10 and 10 per cent off list
1/2 in. to 1 in. inclusive, U. S. S. and S. A. E.
70, 10, 10 and 10 per cent off list
Stove bolts in packages..... 80, 10 and 5 per cent off list
Stove bolts in bulk..... 80, 10 and 7 1/2 per cent off list
Tire bolts 65, 10 and 10 per cent off list || Track bolts, carloads..... | 3c. to 2 1/2c. base |
| Track bolts, less than carloads..... | 4c. to 4.25c. |

Upset Square and Hex. Head Cap Screws

1/4 in. and under..... 80 and 10 per cent off list
9/16 in. to 1 in. inclusive..... 80 and 10 per cent off list

Upset Set Screws

1/4 in. and under..... 80, 10 and 5 to 85 per cent off list
9/16 in. to 1 in. inclusive..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes 75 and 10 per cent off list |

Milled Set Screws

All sizes 70, 10 and 10 per cent off list |

Rivets

Large structural and ship rivets.....\$2.25
Large boiler rivets..... 2.35
Small rivets 70, 10 and 10 per cent off list |

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$38; chain rods, \$36 to \$38; screw stock rods, \$41 to \$43; rivet and bolt rods and other rods of that character, \$36 to \$38; high carbon rods, \$43 to \$50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.15 to \$2.20 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 3/4-in. and 7/16-in., \$2.25 to \$2.30 base; 5/16-in., \$2.25 to \$2.30 base. Boat and barge spikes, \$2.25 to \$2.30 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c. to 2.25c. base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, 1 C., \$9.60; 16-lb. coating, 1 C., \$11.80; 20-lb. coating, 1 C., \$13; 25-lb. coating, 1 C., \$14.25; 30-lb. coating, 1 C., \$15.25; 35-lb. coating, 1 C., \$16.25; 40-lb. coating, 1 C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	54 1/2	28	1/4 to 3/8	+ 3 1/2	+ 23 1/2
3/8 to 1/2	60	33 1/2	3/8	38 1/2	18 1/2
1/2	65	50 1/2	1/2	42 1/2	27 1/2
3/4	69	58 1/2	3/4 to 1 1/4	44 1/2	29 1/2
1 to 3	71	58 1/2			

Lap Weld			Butt Weld		
Inches	Black	Galv.	Inches	Black	Galv.
2	64	51 1/2	2	39 1/2	25 1/2
2 1/2 to 6	68	55 1/2	2 1/2 to 6	42 1/2	29 1/2
7 to 8	65	51 1/2	7 to 12	40 1/2	27 1/2
9 to 12	64	50 1/2			

Butt Weld, extra strong, plain ends			Lap Weld, extra strong, plain ends		
Inches	Black	Galv.	Inches	Black	Galv.
1/4 to 3/8	50 1/2	33	2	40 1/2	27 1/2
3/8 to 1/2	58	38 1/2	2 1/2 to 4	43 1/2	31 1/2
1/2	62	50 1/2	4 1/2 to 6	42 1/2	30 1/2
3/4	67	55 1/2	7 to 8	35 1/2	23 1/2
1 to 1 1/4	69	57 1/2	9 to 12	30 1/2	18 1/2
2 to 3	70	58 1/2			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
Inches	Discount	Inches	Discount
1 1/2 in.	26 1/2	1 1/2 in.	5
2 to 2 1/4 in.	41	1 1/2 to 1 3/4 in.	15
2 1/4 to 3 in.	62	2 to 2 1/4 in.	25
3 1/4 to 13 in.	57	2 1/4 to 3 in.	30
		3 1/4 to 4 1/2 in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed		Cents per Lb.	
No.	Discount	No.	Discount
No. 8 and heavier.....	2.20	Nos. 11 and 12.....	2.30
Nos. 9 and 10 (base).....	2.25	Nos. 13 and 14.....	2.35
		Nos. 15 and 16.....	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
Nos. 17 to 21.....	2.40	No. 28 (base).....	3.00
Nos. 22 to 24.....	2.85	No. 29	3.10
Nos. 25 and 26.....	2.80	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
Nos. 10 and 11.....	3.00	Nos. 25 and 26.....	3.70
Nos. 12 to 14.....	3.10	No. 27	3.85
Nos. 15 and 16.....	3.25	No. 28 (base).....	4.00
Nos. 17 to 21.....	3.40	No. 29	4.25
Nos. 22 to 24.....	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
Nos. 15 and 16.....	2.30	No. 25 (base).....	3.00
Nos. 17 to 21.....	2.85	No. 29	3.05
Nos. 22 to 24.....	2.90	No. 30	3.05
Nos. 25 to 27.....	2.95	Nos. 30 1/2 and 31.....	3.10

Trade Changes

Pneumercator Co., Inc., manufacturer of pneumatic mercury gages for measuring liquid contents of tanks and for indicating ships' draft, will move its factory from Philadelphia to the Sperry Building, 40 Flatbush Avenue Extension, Brooklyn, on Feb. 1. Its general offices will be transferred from 15 Park Row, New York, to the new factory location on that date.

The Reed-Prentice Co. and associated companies, the Becker Milling Machine Co. and the Whitcomb-Balsdell Machine Tool Co., have removed their New York office, which is under the direction of P. K. Dayton, New York sales manager, from the Grand Central Palace, 480 Lexington Avenue, New York, to room 536, Singer Building, 149 Broadway, New York.

The Harder Furnace & Engineering Corporation announces that the sale of its licenses to use the Harder patents and the services of its engineering department will be conducted hereafter by the Fuels Utilization Corporation, which will have its offices in the Knickerbocker Building, 152 West Forty-second Street, New York. The Harder Furnace & Engineering Corporation has removed to that address and will occupy adjacent offices. The services of this department may be engaged through the Fuels Utilization Corporation for consultation, construction or analysis of any combustion or power-plant problems.

B. Freidus & Co., machinery and electric motors, have moved their entire stock of machine tools and office to their new building, 1303 Columbus Avenue, Boston.

After Jan. 15, Joseph J. Simon will furnish engineering and sale service in Southern California, with office in Los Angeles, for manufacturers of mechanical products. He is a mechanical engineer, familiar with engineering sales in connection with street railways, power plants, automotive and manufacturing industries.

Thomas G. Watson, formerly general manager and treasurer, John J. Kelleher, Inc., Brooklyn, scrap iron and steel, has resigned to engage in the scrap iron and steel business at Fifteenth Street and Second Avenue, Brooklyn.

The Green Engineering Co., East Chicago, Ind., manufacturer of chain grate stokers, steam jet ash conveyors, cast-iron hoppers and Sealflex ignition arches, has opened a direct branch sales office in suite 941, Monadnock Building, 53 West Jackson Boulevard, Chicago. The former agency representation has been discontinued in the Chicago district. J. W. Himmelsbach has been appointed district manager with supervision over sales in northern Illinois, northern Indiana, Iowa and Michigan. F. Albert Poppenhusen, president, will maintain an office at the Chicago address. The general sales office will remain at the factory.

The Paragon Tool Co., Seattle, has been appointed warehouse distributor for Deluxe lightweight gray iron pistons, covering the Pacific Northwest.

The Meigs-Powell Co., Milwaukee, organized three years ago to manufacture small tools, precision instruments, jigs, dies, etc., has discontinued business and the corporation has been dissolved. The plant at 522-524 Sixteenth Avenue was badly damaged by fire several months ago. John D. Powell was president; Charles Polachock, vice-president, and Arthur R. Meigs, secretary and treasurer.

The J. W. Paxson Co., foundry machinery and supplies, has occupied its new buildings at Nicetown Avenue and D Street, Philadelphia.

The Acme Fancy Wire Works, Detroit, has changed its name to Acme Wire & Iron Works. When the company started in business in 1899 it made fancy wire products, wire specialties, florist designs, etc., but has since added so largely to its line as to make the new name more appropriate.

The Henry Wels Mfg. Co., Atchison, Kan., steel products, is now being represented in New York by the Philadelphia Fire Retardant Co., 110 West Thirty-fourth Street telephone Fitzroy 6056. The New York office is in charge of G. S. Nobles, for some years past purchasing agent with the Turner Construction Co., assisted by W. S. Miller, who was superintendent of erection with the Variety Fire Door Co. for more than 15 years.

Reed, Fears & Miller, Inc., room 346 Oliver building, 141 Milk Street, Boston, has moved to the eighth floor of that building, rooms 853-854, into larger quarters.

The Federal Supply Co., East Seventy-ninth Street, Cleveland, has been appointed representative in that territory for the Quigley Furnace Specialties Co., Inc., 26 Cortlandt Street, New York, manufacturer of hysolite and insulbrix.

Stanton L. Driefus, broker in iron and steel, has removed from the West End Trust Building, South Penn Square, Philadelphia, to the Philadelphia Bank Building, 421 Chestnut Street.

Plans of New Companies

The Helpershausen Corporation, 43 Tompkins Street, New York, has recently been incorporated, taking over the business and property of Helpershausen Brothers, who have been in business for many years manufacturing boilers. The two partners have reached respectively the ages of 79 and 73 and have incorporated so as to give stability to the business of which two of their sons are now officers. The president of the company, Phillip Helpershausen, has invented some new departures in land and marine boilers.

The United Automotive Body Co., Danville, Ill., is a new organization incorporated under the laws of Delaware. It is not connected with the Ohio corporation of the same name with offices at Cleveland.

The Pittsburgh Nipple & Mfg. Co. has been reorganized and incorporated and has moved to 411 South Main Street, Pittsburgh, where it will continue to manufacture nipples and all special pipe threading, being equipped with new and a larger number of machines.

Industrial Finance

Henry W. Waite, president of the Lord Dry Dock Corporation, 105 West Fortieth Street, New York, has been appointed receiver for the company under bond of \$50,000. The company operates a ship repair plant at Weehawken, N. J., and was incorporated under Delaware laws in 1920, with capital of \$10,000,000. It is said to be solvent but short of liquid assets. Following the receivership appointment, brought about by the action of the Cunard Terminal Corporation with claim of \$21,000 against the corporation, a number of other creditors, with claims aggregating over \$16,000, have filed a petition in bankruptcy against the company.

The Sizer Forge Co., 238 Larkin Street, Buffalo, has filed notice of increase in capital from \$300,000 to \$500,000.

The Pneumatic Scale Corporation, Ltd., Quincy, Mass., manufacturer of weighing equipment and devices, has filed notice of increase in capital from \$1,500,000 to \$2,800,000.

The United States Automotive Corporation, Connersville, Ind., operating the Lexington Motor Co., Ansted Spring & Axle Co., Connersville Foundry Corporation, all of Connersville, and other automotive organizations, has disposed of a bond issue of \$1,750,000, the proceeds to be used for financing general operations, etc.

The Strom Steel Ball Co., 621 Harr Place, Oak Park, Chicago, has filed notice of increase in capital from \$150,000 to \$250,000.

David Strouse, 39 Center Street, New Haven, Conn., has been appointed receiver of the American & British Corporation, with plants at Bridgeport, Conn., and Providence, R. I. The company went into the receiver's hands two years ago.

The Atlantic Shipping Co., Stonington, Conn., is to dissolve. The company was organized in 1908, and during its existence constructed 10 vessels.

The Warren Tool & Forge Co., Youngstown, has increased its capitalization to \$1,800,000, and on the basis of appraisal values has absorbed the American Block & Mfg. Co. and the General Malleable Co. properties.

The Noiseless Typewriter Co., Inc., Middletown, Conn., organized as an operating company, has transferred all assets and liabilities to a Delaware corporation of the same name, a holding company, and will shortly file with the secretary of Connecticut a certificate of dissolution. No changes in the personnel of the Middletown plant organization are involved.

A public offering of \$1,750,000 United States Automotive Corporation 8 per cent first mortgage convertible bonds, dated Aug. 31, 1921, and due Sept. 1, 1931, part of an authorized issue of \$3,000,000, was made last week. The company owns a controlling interest in the Ansted Spring & Axle Co., Connersville Foundry Corporation, and other manufacturing units.

The General Electric Co. offers employees the opportunity to subscribe to 7 per cent debenture 15-year bonds dated Nov. 1, 1921, subscriptions being limited to \$1,000 to each person. In addition, \$10 bonds sold only for cash and 50c. subscription stamps, both convertible into the larger bonds, are offered. Subscriptions will be received until Jan. 14.

A shortage of electric current due to a protracted drought in the Alpine regions led to the use for driving machinery in the Fiat works, Turin, Italy, of some 150 of the agricultural tractors the company is building. The rating of each tractor engine is 25 to 35 hp. and the statement is made that the power developed by them all totaled more than 5000 hp., indicating the employment of tractor engines on an unusual scale for temporary power purposes.

Machinery Markets and News of the Works

GAIN IN MACHINERY SALES

January Shows Improvement Over December, Which Was Best Month in 1921

Delaware, Lackawanna & Western Railroad Places Orders Aggregating About \$100,000—Other Important Buying

Evidences of slow but steady improvement in the machine-tool situation multiply. From the Cincinnati district it is reported that the outlook is sufficiently encouraging to bring about the initiation of plans for resumption of work at some machine-tool plants within the next 60 or 90 days.

January business is in fair volume, considering the lean sales figures of the past year. With many sellers December was the best month of 1921, and January seems likely to surpass last month in the volume of orders. Inquiries are unquestionably coming out in greater number, and while the most of them are for single machines or very small lots, there are a number of fair-sized lists before the trade.

Outstanding among purchases of the past week was the placing of orders for about 40 tools by the Delaware, Lackawanna & Western Railroad, the total outlay being about \$100,000. Two large New York houses specializing in railroad shop equipment received the bulk of the business. Other railroad buying is inconsequential, but includes a few additional tools acquired by the Seaboard Air Line and purchases of single tools

by the Erie Railroad and the Santa Fe. The Third Avenue Railway Co., New York, has bought four tools.

A New England manufacturer of screw machines has received an order for \$50,000 worth of tools from a Middle Western automobile manufacturer. The General Motors Corporation has bought six large horizontal boring mills for one of its Detroit plants and a like order has been placed by a manufacturer of automatic brakes.

Detroit automobile plants are preparing for 1922 production schedules, and within the past 30 days have inquired for about \$250,000 worth of machine tools. Many of the inquiries are for single machines, but lists up to 25 or 30 tools are being figured on. Actual placing of orders will probably hinge on the automobile buying that develops within the next month or two.

The Western Electric Co., Chicago, has placed a large order for Gisholt special machines; the Hannifin Mfg. Co., Chicago, has bought a small list of miscellaneous equipment; the Board of Education of South Bend, Ind., has bought a list of tools for a vocational training school.

The complete list of the Streets Co., Chicago, consisting of about 40 fabricating machines for steel car work, mentioned briefly last week, is published in this issue under the Chicago heading.

Export business is quiet, but a few orders are being received. A Cincinnati manufacturer of electrical tools has received a large order from Australia, the first of its kind in 16 months, and another good-sized order has been received from Japan.

New York

NEW YORK, Jan. 17

The Delaware, Lackawanna & Western Railroad has placed orders for about \$100,000 worth of machine-shop equipment, a large part of the business going to two companies which specialize in railroad tools. There has been no other important railroad buying, but the Erie Railroad has ordered a Southwark double-end punch. The Third Avenue Railway Co., New York, has bought four machine tools and other repair shop equipment.

The Johns-Manville Co., New York, which was reported last week as having issued an inquiry for about a dozen tools for its plant at Waukegan, Ill., has added several tools to this list.

A considerable number of planers with special attachments will be required for planing the cast iron segments for the New York-New Jersey vehicular tunnel. Bids for the segments close on Feb. 7 and the successful bidder will undoubtedly purchase the necessary tool equipment.

Demand for used machinery is fairly active. A dealer sold \$17,000 worth of tools to a single manufacturer, the purchase including two 7-ft. radial drills, lathes and grinders.

Though December was the best month of 1921 with some machine-tool sellers, it now appears that January sales, in several instances, will show a slight increase over December. Inquiries are slightly more numerous in some lines and there is more of a disposition on the part of buyers to close with a reasonable degree of promptness.

Representatives of crane builders in this district report the past week to have been about as dull as any week last year. Very few new inquiries appeared and practically no

sales were reported. Several old inquiries have been postponed until spring or indefinitely. The Driver Harris Co., Harrison, N. J., has postponed until spring, purchase of the 20-ton electric crane for which it inquired last year. The Thomas Crummins Contracting Co., New York, recently in the market for a locomotive crane has purchased two Bucyrus steam shovels. Both the Lobdell Car Wheel Co., Wilmington, Del., and the American Brake Shoe & Foundry Co., New York, which are among the bidders on the vehicular tunnel to be constructed under the Hudson River asked for estimates on small cranes a short time ago. The Utah Copper Co., New York, has purchased a 40-ton, 20-ft. 10-in. span electric crane from the Shaw Electric Crane Co. for Magna, Utah. The Harrie Engineering Co., Ltd. 208A St. Nicholas Building, Montreal, Can., has inquired for a 15-ton, 50-ft. boom locomotive crane and five 2-ton electric hoists for coal handling.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has acquired the plant of the Goodyear Tire & Rubber Co., Jackson Avenue and Honeywell Street, Long Island City, consisting of a six-story building, totaling about 63,000 sq. ft. of space, and will be used by the new owner as an Eastern branch plant.

The Knickerbocker Ice Co., 41 East Forty-second Street, New York, has awarded contract to the Turner Construction Co., 242 Madison Avenue, for a new two-story ice-manufacturing plant at 148-50 Elizabeth Street, 50 x 100 ft., estimated to cost about \$100,000, including machinery.

M. F. Westergren, Inc., 213 East 144th Street, New York, manufacturer of sheet metal products, has filed plans for a new two-story plant, 28 x 96 ft., on 144th Street.

Motors and other electrical and mechanical equipment will be installed in the new printing plant to be erected by the Board of Directors, Fordham University, Fordham Road, New York, estimated to cost about \$250,000. Plans

will be prepared by R. J. Reilly, 477 Fifth Avenue, architect and engineer.

The New York Edison Co., 130 East Fifteenth Street, New York, will take bids soon for the construction of a two-story and basement power house at 122 East Thirteenth Street. Plans are being drawn by William Whitehill, Forty-first Street and Sixth Avenue.

The Lightoller Co., 569 Broadway, New York, manufacturer of electric lighting fixtures, has leased the five-story building at 65-67 Wooster Street for a local plant.

Merkel Brothers, Chichester Avenue, Jamaica, L. I., are having plans prepared for a three-story cold storage and refrigerating plant, 60 x 75 ft., on Chichester Avenue. Louis Allmendinger, 20 Palmetto Street, Brooklyn, is architect.

The Perfect Brick & Hollow Tile Co., 188 Montague Street, Brooklyn, is taking bids for a new one-story plant, 97 x 100 ft., on Grand Street, estimated to cost about \$27,000. Silverstein & Infanger, 190 Montague Street, are architects.

The L. H. Motor Car Co. Long Island City, N. Y., has leased a portion of the building at Vernon and Webster avenues, totaling about 5000 sq. ft. of space, for new works.

The State Hospital Commission, Albany, N. Y., has awarded contract to C. J. Burgess, Marcy, N. Y., for a new cold storage plant at the Marcy State Hospital, estimated to cost about \$131,000 with equipment.

Fire, Jan. 11, destroyed a number of industrial plants at 289-97 Leonard Street and 102-6 Richardson Street, Brooklyn, including the two-story works of the Brooklyn Fireproof Sash & Door Co.; Samuel Solomon, operating a wheelwright shop; Empire Moulding Co., and Samuel Weinstein, manufacturer of sash and doors, with total loss estimated at about \$150,000.

The Computing-Tabulating Recording Co., 50 Broad Street, New York, manufacturer of calculating machines, has acquired the property and business of the Ticketograph Co., 549 West Washington Street, Chicago, manufacturer of machines for computing piece-work rates in factories, and will operate the company as a subsidiary organization.

The Motor Car Parts Corporation, New York, has leased property at 804 Ninth Avenue for local works.

J. Langner, 700 Trinity Avenue, New York, is preparing plans for a two-story automobile service and repair building, 50 x 60 ft., at Broadway and 185th Street, estimated to cost about \$90,000. John De Hart, 1031 Fox Street, is architect.

The Ingram Motor Co., New York, care of Joseph Ingram, president, 2 Rector Street, will construct by day labor its new automobile manufacturing plant at Norfolk and Atlantic avenues, Egg Harbor, N. J. It will be two and one-half stories, with power plant, totaling 40 x 200 ft. H. B. Perry, company address, is engineer.

The New Jersey Power & Light Co., Dover, N. J., will acquire the Woodbourne Electric Light, Heat & Power Co., operating in Morris County, and will make extensions and improvements in power plant and system.

L. O. Koven & Brother, 154 Ogden Street, Jersey City, N. J., manufacturers of galvanized range boilers, etc., have filed plans for a new one-story factory to cost about \$12,000, exclusive of equipment.

The Board of Education, Broadway, Bayonne, N. J., will soon call for bids for a three-story junior high and vocational school, 200 x 300 ft., at Avenue A and Twenty-ninth Street, estimated to cost about \$400,000. Donald G. Anderson, 28 East Forty-ninth Street, New York, is architect.

The Board of Education, South Broad Street, Elizabeth, N. J., is taking bids until Jan. 26, for a new junior high school, to include vocational department, at First and Second avenues and Loomis Street. It will be two-stories, 150 x 370 ft., and is estimated to cost about \$700,000. C. Godfrey Poggis, 275 Morris Avenue, is architect.

The Lambert Hoisting Engine Co., 117 Pioneer Street, Newark, N. J., has taken over the property and business of the W. A. Crook & Brothers Co., manufacturer of kindred products, and will merge the works with its present organization. The name will be changed to that of the purchasing company.

Phineas Jones & Co., 305 Market Street, Newark, manufacturers of automobile bodies, wagons, etc., have awarded contract to the Becker Construction Co., 361 Grove Street, for its one-story plant, 50 x 300 ft., on Hillside Avenue, near Newark, estimated to cost about \$300,000, including equipment.

The Board of Education, East Orange, N. J., has authorized the purchase of property at Elmwood Avenue and South Burnett Street, 356 x 701 ft., for the erection of a new

junior high school, to include a vocational department. Plans will be placed under way at an early date.

The Board of Education, Newark, is considering a request from Superintendent of Schools Corson for an appropriation of \$108,000 for the purchase of equipment for the new Seymour vocational school, now nearing completion.

Philadelphia

PHILADELPHIA, Jan. 18.

The Jacques Mfg. Co., Smick Street and Green Lane, Philadelphia, manufacturer of automobile bodies, has acquired the two-story factory at Seventh and Rockland streets, totaling about 40,000 sq. ft. for a new plant. Operations will be concentrated at this location. The company has acquired, also, an adjoining tract of land, aggregating 3 acres.

The United States Cooperage Co., Philadelphia, has leased the three-story machine shop at 3103-7 Grays Ferry Road, and will operate at this location. The property is owned by the Lutz Co., machinist, which previously occupied it.

The Fanning-Schuett Engineering Co., 502 Ruscomb Street, Philadelphia, manufacturer of engineering products, has awarded contract to Hollenback, Inc., 1804 Brandywine Street, for a two-story machine shop on property recently acquired at Third and Cayuga streets.

J. M. White, 1116 Olive Street, Philadelphia, operating a wire manufacturing and wire-braiding plant, has acquired adjoining property, 60 x 64 ft., and will use the site for the erection of an addition.

The city purchasing agent, A. Lincoln Acker, room 312, City Hall, Philadelphia, will receive bids until Jan. 23, for conveyor chains and parts, firebrick and other materials.

The Emergency Fleet Corporation, Philadelphia, is asking for bids until Feb. 7, for the purchase of the stiff leg derricks at the Hog Island Shipyard, including 350 5-ton double-mast derricks; 40 5-ton, single-mast; 44 12-ton, single-mast, and derrick operating machinery, including hoists, motors, controllers, etc.

The Board of Education, Scranton, Pa., has selected Edward Langley, architect, Scranton Life Building, to prepare plans for a new central high school addition, to include a vocational department estimated to cost about \$175,000. J. H. Williams is president of the board.

Fire, Jan. 13, destroyed a portion of the plant of the Cochrane Corporation, Earnest, Pa., manufacturer of boilers, etc., with loss estimated at about \$100,000. Under normal conditions the company gave employment to about 200 operatives.

The Wyoming Valley Water Supply Co., Hazleton, Pa., is planning the construction of an electric light and power house at Hudsondale, Pa., to be operated in connection with its pumping plant.

The Nilco Lamps Works, Inc., St. Marys, Pa., recently organized to manufacture electric lamps, has acquired the local plant of the General Electric Co., as well as the similar factory of this organization at Emporium. Arrangements are being made for immediate operations and both plants will be placed in service. B. G. Erskine is president, and J. C. Wortman, vice-president.

Directors of the Boll Brothers' Mfg. Co., Fourteenth and Howard streets, Harrisburg, Pa., manufacturer of metal beds and springs, have voted to rebuild the plant, recently partially destroyed by fire with loss estimated at about \$30,000.

The Board of Education, Harrisburg, Pa., has awarded contract to S. W. Shoemaker & Son, Harrisburg, for the second unit of the new senior co-educational high school, at a cost of \$208,680. The structure will include the vocational shops, with machine and electrical shops, automobile and wood-working departments, etc. A bond issue has been arranged for \$300,000 to finance the construction and equipment.

Officials of the Reading Machinery Exchange, 437 Washington Street, Reading, Pa., have organized the Reading Machine & Tool Co., to succeed to the present business and expand operations.

A power house will be constructed in connection with the new shop and warehouse to be erected at Franklin and Fourth streets, Williamsport, Pa., by H. A. Moore, 114 Elm Street, Milton, Pa., estimated to cost about \$50,000.

Electric motors and other power equipment will be installed in the three-story and basement printing plant to be erected by the Easton Daily Express Co., 26 North Fourth Street, Easton, Pa., estimated to cost about \$150,000. A. D. Childsey, Jr., 341 Northampton Street, is architect.

Fire, Jan. 7, destroyed the plant and equipment of the Standard Slag Co., Sharpsville, Pa., with loss estimated at about \$75,000.

The Vulcaweld Rubber Co., Pottstown, Pa., will expend about \$200,000 for building and equipping its new plant on property recently acquired. The works will consist of a two-story factory, 60 x 260 ft., with power house and garage. Plans are being drawn. E. W. Smith is head.

The Harrisburg Stanley Spring Co., Harrisburg, Pa., has commenced the erection of its new one-story plant, 50 x 100 ft., and expects to have the structure ready for occupancy prior to March 1, for the installation of equipment to manufacture automobile springs. Harry D. Delmotte, Twelfth and Herr streets, is secretary.

The United Ice & Coal Co., Harrisburg, Pa., has acquired property at Seventh and Schuylkill streets, and will use a portion of the site for a new ice-manufacturing plant, with initial daily capacity of 100 tons. Plans have been drawn and it is proposed to have the works ready for service in June. The company is now operating a similar plant at Forster and Cowden streets which will be continued. Mahlon Miller heads the company.

Horace T. Potts & Co., 316 North Third Street, Philadelphia, will not build a foundry at Erie Avenue and D Street, Philadelphia, as recently stated in THE IRON AGE, but a steel warehouse. Work on the latter will begin some time in the near future.

Buffalo

BUFFALO, Jan. 16

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., has tentative plans for a new car and locomotive repair shop in the vicinity of DuBois, Pa., to be one and one-half stories, 135 x 230 ft., and estimated to cost close to \$175,000.

The Board of Education, West Genesee Street, Syracuse, N. Y., will soon call for bids for a two-story junior high school, 175 x 250 ft., at Brighton and Midland avenues, to include a vocational department. Gordon Wright, City Bank Building, is architect. E. M. Tooke is president of the board.

Fire, Jan. 9, destroyed the steel car repair shop of the Pennsylvania Railroad Co., Sixth and Wayne streets, Olean, N. Y., 50 x 175 ft., with loss estimated at about \$20,000.

The St. Lawrence Transmission Co., Potsdam, N. Y., has been granted permission to build a new power plant at Colton, St. Lawrence County, for service in this section.

The Hornell Repair & Construction Co., Hornell, N. Y., operating the local shops of the Erie Railroad under lease for about two years, has concluded arrangements with the company for the operation of its locomotive and car repair shops at Susquehanna, Pa., under a similar agreement, effective Jan. 15.

The State Hospital Commission, Albany, N. Y., is taking bids until Jan. 25 for the installation of new electrical equipment at the State Hospital, Binghamton. L. F. Pilcher, Capitol Building, Albany, is state architect. L. M. Farrington is secretary of the commission.

A vocational department will be installed in the school to be erected by the Board of Education, Tonawanda, N. Y. to cost about \$100,000.

The Franklin Automobile Co., Syracuse, N. Y., will equip a portion of its plant for the manufacture of a four-cylinder, air-cooled motor, automobile, weighing about 1000 lb., and designed to be sold for \$1,000. It is proposed to develop an output of 100 cars per day. H. H. Franklin is president.

The service station of the Hall Motor Co., Brayton and West Utica streets, Buffalo, was partially destroyed by fire Dec. 21, with a loss of \$50,000. It will be rebuilt at once.

The American Radiator Co., 1807 Elmwood Avenue, Buffalo, will erect an addition to a compressor house, 50 x 80 ft., to cost \$8,000.

Pittsburgh

PITTSBURGH, Jan. 16.

The machine tool trade at present finds chief encouragement from inquiries rather than orders. Dealers and manufacturers' representatives are figuring against a number of inquiries and are hopeful of getting orders before long. One firm recently sold a 5-hp. motor-driven United States heavy floor grinder and a Fay & Egan joiner. Others also are selling individual tools, but there is a dearth of sales of more than one tool to a buyer. Railroad inquiry is lacking and the steel and associated industries are moving slowly. In the crane market much interest centers in the 10-ton, with 5-ton auxiliary which the United Engineer-

ing & Foundry Co. is expected to place with one of three companies probably this week. A crane of similar capacity also is wanted by the Ellwood City Forge Co., Ellwood City, Pa. The National Tube Co., is likely to close before long for a 15-ton overhead for its Christy Park works, McKeesport, Pa. The Morgan Engineering Co., Alliance, Ohio, was the successful bidder for 75-span bucket crane for the Diamond Portland Cement Co., Middle Branch, Ohio, the bucket being of 2-cu. yd. capacity and to be furnished by the Blaw-Knox Co., Pittsburgh. The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has been awarded a 5-ton ore bridge hoist with a lift of 100-ft. by the Cambria Steel Co., Johnstown, Pa.; a 2-motor, 3-ton hoist for the Edgar Thomson works, and two 2-ton hoists for the Duquesne works of the Carnegie Steel Co. Inquiries for hoists are numerous, the local office of one leading maker having bids out on a total of 125. Bids recently went in against a blooming mill for the Steubenville, Ohio, works of the Wheeling Steel Corporation.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of sanitary fixtures, etc., has awarded a contract to the B. A. Groh Construction Co., 847 West North Avenue, for a one-story addition to its plant on Prohle Avenue, 115 x 130 ft., to be used as a plating works.

The Oil Well Supply Co., Oil City, Pa., manufacturer of oil well equipment, will build two additions to its plant. One will be equipped with an electric furnace and auxiliary apparatus.

A vocational department will be installed in the new junior high school to be erected by the Board of Education, Oil City, Pa., estimated to cost about \$350,000. Plans will be prepared at once.

The Board of Education, Pittsburgh, has filed plans for a new high school at Chartiers and Hulton Avenues, to include a vocational department, estimated to cost about \$700,000. A list of equipment has been prepared for the vocational department in the high school on Howard Street, East Pittsburgh.

A one-story and basement repair and service shop, 25 x 40 ft., will be erected by the Mutual Telephone Co., 19-21 East Ninth Street, Erie, Pa., plans for which have been prepared by Cody, Hicks & Davidson, Ariel Building.

Machinery valued at \$50,000 was destroyed by fire, Jan. 11, at the Avella mine of the Pittsburgh & Meadowlands Coal Co., Avella, near Washington, Pa. Plans are under way for the immediate replacement.

Freight-handling machinery, etc., will be installed in the new five-story warehouse to be constructed on Maple Avenue, Johnstown, Pa., by the Johnstown Terminal Warehouse Co., now being organized. It will be 130 x 250 ft., and is estimated to cost about \$450,000. William Steele & Sons, Sixteenth and Arch streets, Philadelphia, are the architects and engineers.

The Board of Education, Brackenridge, Pa., has acquired property at Natrona Heights, for a new union high school, including vocational department, for Brackenridge and Harrison townships. It is estimated to cost about \$300,000.

The Clarion River Power Co., Foxburg, Pa., is completing surveys and will soon prepare plans for its proposed new hydroelectric generating plant on the Clarion River. It is proposed to build two main power plants in the vicinity of Clarion and Foxburg, respectively. The project is estimated to cost close to \$2,000,000.

Fire, Dec. 31, destroyed a portion of the plant at Mine No. 1 of the Ellsworth Colliery Co., Ellsworth, Pa., with loss estimated at about \$30,000, including equipment. It will be rebuilt.

The Resistant Alloy Casting Co., New Cumberland, W. Va., recently organized, has acquired the local foundry of the Davis Price Co., and will begin immediate operations. An extensive capacity will be developed.

The Chesapeake & Ohio Railroad Co., Baltimore, has tentative plans under way for its new repair shops at Huntington, W. Va.

The Bond Motor Co., Bluefield, W. Va., will break ground at once for a three-story automobile service and repair building estimated to cost close to \$50,000. Garry & Sheffy, Bluefield, are architects.

The Board of Education of the Glenville District, Linn, W. Va., is arranging a list of equipment for installation in the vocational department at the new two-story high school at Sand Fork, near Linn. J. A. Radcliffe is president of the board.

The Berkeley Garage Co., West Race Street, Martinsburg, W. Va., M. Doland, head, has awarded contract to the Cox Construction Co., 606 West King Street, for a new three-story automobile service and repair building, 90 x 115 ft., estimated to cost about \$50,000.

New England

BOSTON, Jan. 16.

A manufacturer of automatic screw machines has secured a \$50,000 order from a Middle Western maker of automobiles, a Maine paper mill has purchased a new 14 in. x 6 ft. Plather lathe, while a 21-in. upright drill, 15-in. shaper, and a fairly large air compressor, all used equipment, were purchased by local companies and gear cutting equipment by a Boston manufacturer of gears. These sales constitute practically all the business reported the past week. Users of machine tools and dealers are devoting most of their activities to inventories which partially explains the inactivity of the market.

The accumulation of prospective business continues, however, and has assumed proportions to warrant optimism. No large lists have developed, but there has been a noticeable increase in those involving from one to three or four tools, especially from manufacturers in the southern section of this territory. Much encouragement is derived from the fact that inquiries come from a wide range of manufacturers and concern a variety of equipment, generally conceded a sign of a general industrial revival in the making. Opinions as to when prospects in hand will develop vary considerably, but a majority of dealers are inclined to look for a fair resumption of bookings the latter part of this month or early in February. The press market possibly holds more promise than others, but practically all inquiries are for used equipment. Among new inquiries is one for a 10 ft. used shear from the Edes Mfg. Co., Plymouth, Mass., and for a 14-in. x 6 ft. used lathe from the Hopkins Garage, Wilton, N. H.

No changes in prices for machine tools are reported. Some manufacturers of lathes are inclined to tighten up on prices. That is, they are making no changes in new discounts on the lathes, but discounts on the attachments appear to be growing smaller, which pulls down the average discount for the equipment complete.

Contract has been awarded for extensive changes in the foundry of the Union Metallic Cartridge Co., Bridgeport, Conn.

Plans have been revised for a plant, 60 x 116 ft., to be erected by the National Biscuit Co., North Liberty Street, Waterbury, Conn. A can department is included.

The Uxbridge Worsted Co., Uxbridge, Mass., will erect a coal handling plant. Carver, Macomber & West, Boston, are the engineers.

The Mohawk Mfg. Co., Waterbury, Conn., sheet brass goods, will move to 56-66 Hamlin Street, Middletown, Conn., about April 1 where property has been purchased to which a 50 x 50 ft. addition will be built.

The H. L. Judd Co., 42 South Cherry Street, Wallingford, Conn., metal products, has about completed plans for a five-story 50 x 100 ft. addition.

The plant of A. L. Adams, 307 Center Street, Bridgeport, Conn., cloth cutting and binding machinery manufacturer has been purchased by J. J. Musante, and others of Bridgeport, from the A. L. Adams Estate. A company will be organized to operate the works.

The Department of Public Works, Hartford, Conn., plans to remodel its property on Wells Street into a garage and repair shop. Paul Mason is superintendent.

Herrhman & Levine, 223 Main Street, Hartford, Conn., are planning the construction of a two-story 85 x 190 ft. garage, service station and repair shop. F. C. Walz, 407 Trumbull Street, Hartford, is architect and bids will be called for shortly.

Julius Reibert, Mountain Road, East Hartford, Conn., has had plans completed for a one-story 55 x 220 ft. brick and concrete garage and repair shop on Park Street.

A vocational department will be installed in the new high school to be erected at Hartford, Conn., at a cost of over \$1,000,000. Bids will be taken soon.

Dr. M. H. Davitt, 525 North Main Street, Palmer, Mass., is contemplating the construction of a public garage and service station on North Main Street.

The Windham Mfg. Co., South Windham, Me., is having plans drawn for a hydroelectric generating plant at its textile mills.

The S. H. Wheeler Estate, 1188 Main Street, Bridgeport, Conn., is having revised plans prepared by C. F. Baron, architect, 79 Sage Street, for a three-story brick and reinforced concrete garage, service and repair shop, 100 x 120 ft., at a cost of \$100,000.

The American Hardware Corporation, New Britain, Conn., has acquired the factory of the New Britain Machine Co., used during the war for large gun assembling work. The new owner will use the building as an extension.

Bird & Son, Walpole, Mass., manufacturers of roofing,

will build a one-story addition, 80 x 220 ft. Charles T. Main, 201 Devonshire Street, Boston, is architect.

The Board of Education, Quincy, Mass., is taking bids for a new three-story high school, with two-story vocational school adjoining, and power house, estimated to cost about \$750,000. Cram & Ferguson, 248 Boylston Street, Boston, are architects.

Fire, Jan. 10, destroyed a portion of the plant of the Angler Mills, Ashland, Mass., manufacturer of waterproof paper products, including machinery, transmission apparatus and other equipment, with loss estimated at about \$200,000.

The Stanley-Boston Co., Boston, recently organized to represent the Stanley Motor Carriage Co., Newton, Mass., will operate a complete machine and repair works at 620 Commonwealth Avenue, with equipment for handling aluminum body work, engines, parts production, etc. Francis W. Bellows and G. R. McNear head the company.

The United Illuminating Co., New Haven, Conn., has had plans prepared for an addition to its power plant on Grand Avenue, including improvements in the present building. Westcott & Mapes, Inc., New Haven, are architects.

The Southern Berkshire Power & Electric Co., Rockdale, Mass., has work under way on a new hydroelectric power plant, with initial capacity of about 600-hp.

A vocational department will be installed in the new high school to be erected by the Board of Education, Revere, Mass., estimated to cost about \$250,000. E. I. Wilson, Beach Street, is architect.

Fire, Jan. 8, destroyed the plant of the Graphite Mines Corporation, Cranston, R. I., with loss estimated at about \$100,000, including equipment and stock.

The New England Power Co., Worcester, Mass., has completed plans and will commence the immediate erection of its new hydroelectric generating plant at Whittington, Vt., estimated to cost approximately \$1,000,000.

A vocational department will be installed in the new high school to be erected by the School Commission, Westfield, Mass., estimated to cost about \$200,000. Preliminary plans are being prepared by M. B. Harding, 33 Elm Street, architect.

Chicago

CHICAGO, Jan. 16.

While it cannot be said that buying is brisk, it is notable that numerous inquiries which have been hanging fire for some time are now coming to a head and some have already resulted in orders. One prominent dealer reports that if bookings should continue throughout the year at the rate of the first two weeks of 1922, his house would have no complaint to make. Much of the current inquiry is for machines desired to reduce production costs, or to enable the buyer to branch into new lines of manufacture.

The Santa Fe has purchased a 36-in. engine lathe in addition to the tools reported in this column as bought a week ago. Otherwise the local railroads have taken no further action on their lists. The Board of Education, South Bend, Ind., has made additional purchases for a junior high school. The orders include a 24-in. x 24-in. x 6-ft. planer, a 16-in. shaper, a No. 2 universal milling machine and a 16-in. x 10-ft. engine lathe. The Western Electric Co., Chicago, has placed a large order for special purpose machines with the Gisholt Machine Co., Madison, Wis. The Hannifin Mfg. Co., Chicago, recently bought miscellaneous equipment, including a broaching machine, engine lathe and a grinder. The Chicago Bridge & Iron Works has bought a 20-in. crank shaper. The list of the Streets Co., Chicago, mentioned in this column a week ago, was put out primarily to secure prices for estimating the cost of equipping its plant for the manufacture and repair of steel railroad cars. It is improbable that the company will take immediate action on the inquiry, but in view of the active buying of rolling stock by the railroads at the present time, machinery dealers are hopeful that the list will eventually be bought. The list follows in full:

One single end punch 60-in. throat with triple gag socket, 1 x 1 in.

One single end multiple punch with sufficient depth throat and hand operated spacing table and provided with gag sockets, for punching long angles, cover plates, etc., and motor.

One heavy bulldozer and motor, with sufficient capacity to form diaphragms and other parts of heavy car material, capacity approximately 300 tons; 1-in. stroke.

One plate shear and motor, for shearing and squaring plates used in steel car construction, approximately 5/8 x 144 in.

One 12-ft. x $\frac{1}{2}$ -in. bending brake and motor, for flanging steel car floor plates, end plates, etc.

One horizontal punch and motor, 15-in. throat, capacity 1 x 1 in.

One heavy-duty punch and shear and motor, capacity $2\frac{1}{2}$ x $1\frac{1}{2}$ in.

One multiple punch and motor, capacity 600 tons.

One 300-ton hydraulic press.

Two overhead electric traveling cranes, 10 tons capacity, 90-ft. span.

One 3-in. single head threading machine and motor.

One bulldozer and motor, face of cross head approximately 16 in. x 70 in., capacity, 390,000 lb.

One heavy duty drill press and motor, for drilling heavy material, capacity approximately $2\frac{1}{2}$ -in. to 3-in. hole.

Two single end punches and motors, provided with triple gag sockets, 15-in. throat, capacity $1\frac{1}{4}$ x 1 in., for punching I-beams, channels, etc.

One 16-in. engine lathe and motor.

One 300-ton car wheel and axle press and motor.

Two double end car axle lathes and motors.

Two 2-in. triple head bolt cutters and motors.

One 2-in. six-spindle nut tapper and motor.

One large blower and motor sufficient to take care of six blacksmith fires.

One $3\frac{1}{2}$ -in. upsetting, or forging, machine and motor.

One $\frac{1}{2}$ -in. bolt header and motor.

One $1\frac{1}{2}$ -in. bolt header and motor.

Two 200-lb. Bradley helve hammers and motors.

One eye bender and motor, to take stock $1\frac{1}{2}$ -in. diameter bent hot around a $2\frac{1}{4}$ -in. mandrel.

Two single head or single spindle drill presses and motors, to drill all sizes of holes up to 2 in. in diameter inclusive.

One 4-spindle drill press and motor to drill all sizes of holes up to 2 in. in diameter inclusive, also suitable for drilling arch bars.

One shaper and motor for handling tools used in steel car work, medium size.

One 1500-lb. steam hammer.

One standard size grindstone and motor.

Two emery wheel stands and motors, suitable for universal grinding.

One double end punch and shear and motor, 24-in. throats to punch $1\frac{1}{4}$ -in. hole in 1-in. material and for shearing long flats and rounds, 2-in. diameter and 6 x 1-in. flats. Shear blades placed lengthwise of machine.

One single end punch and shear and motor, 48-in. throat, to punch 2-in. hole in 1-in. material and for shearing $2\frac{1}{2}$ -in. rounds and 8 x 1-in. flat bars. Shear blades placed lengthwise of machine.

One automatic hack saw and motor, to cut all sizes of material up to 7 in. x 8 in.

One 10-ton electric overhead traveling crane with magnet; 50 ft. long center to center of crane rails; for runway over stripping tracks.

One alligator shear for scrap dock, for shearing scrap metal parts, approximately 8 x $1\frac{1}{2}$ -in. flats and 3-in. rounds.

No further changes in prices have been announced, except a reduction of about 20 per cent on precision bench lathes by the S. A. Potter Tool & Machine Works, New York.

C. Schultz, 7251 Vernon Avenue, Chicago, has let contract for a one-story machine shop, 50 x 147 ft., at 6916-6918 Cottage Grove Avenue, to cost \$14,500.

The Big Four Artificial Ice Co. has had plans prepared by Frans Roy, 7817 South Shore Avenue, Chicago, for a one-story plant, triangular in shape, 134 x 152 x 488 ft., at 1917-1933 North Springfield Avenue, to cost \$35,000.

The Cicero Chicago Corrugated Co., 1542 South Fifty-first Court, Cicero, Ill., will reconstruct at once its one-story plant which was destroyed by fire on Jan. 7.

The Grigsby-Grunow-Hinds Co., 1900-1906 West Lake Street, Chicago, recently incorporated with \$150,000 capital stock, has leased 10,000 sq. ft. of floor space in the building at the address given and has purchased most of the equipment for the manufacture of electrical devices and automobile accessories. The officers include: President and general manager, B. J. Grigsby; vice-president, O. E. Grigsby; secretary and treasurer, W. C. Grunow; and assistant secretary and treasurer, O. Q. Hinds.

Waldo G. Gerhardt of the Bendix Engineering Co., South Bend, Ind., has secured a patent on a high compression motor which, it is said, can be successfully operated by any kind of oil. Plans are under way to organize a company and set up a plant in South Bend to manufacture the motor.

C. F. Chaffield, Escanaba, Mich., is negotiating for the purchase of the old electric light plant at Iron Mountain, which he proposes to remodel into a brass foundry.

The American Foundry & Mfg. Co., Kansas City, Mo., is being organized by Henry H. Akers to manufacture stoves, furnaces, hardware specialties and oil burners and has purchased a site of three acres, lying between Seventeenth Street, Eighteenth Street, Manchester Avenue and the Kansas City Southern Railroad tracks. Contract has been awarded for the erection of the first unit of the plant, 80 x 140 ft., to cost \$30,000. Directors of the company include: H. H. Akers, president and general manager; John T. Sullivan, president Kansas City Foundry Co.; Charles J. Klassen and William L. Krenzer, owners of the Central Pattern Works; Dallas Cooley, secretary-treasurer Kansas City Foundry Co.; R. Richter and O. S. Barrows, all of Kansas City.

Davenport, Iowa, is expected to call a special referendum on the proposed issuance of bonds to cover the cost of the erection of a municipal electric light and power plant. Alvord & Swasby, engineers, Chicago, have been retained to make a survey of the possibilities of the project.

The Board of Education, Peoria, Ill., has awarded contract to William M. Allen Sons & Co., 929 Jefferson Building, for an addition to the high school for manual training and vocational work. Dr. George Mitchell is president of the board.

The National Stamping & Electric Co., 424 South Clinton Street, Chicago, has acquired the plant and business of the Lindstrom-Smith Co., 3212-38 West Lake Street, manufacturer of electrical products, with adjoining site. An addition will be built and operations concentrated at this point, to include the manufacture of a combination stove, toaster and electric iron and other appliances.

A vocational department will be installed in the new two-story and basement junior high school to be erected at Clear Lake, Wis., estimated to cost about \$100,000. Plans are being prepared by Edwins & Edwins, 911 Northwestern Building, Minneapolis, Minn., architects.

The Great Western Railroad Co., Minneapolis, Minn., has tentative plans under way for new locomotive and car repair shops at Winona, Minn., estimated to cost \$200,000, including machinery.

The Board of Education, Shelby, Iowa, has rejected bids for its two-story and basement high school, 120 x 190 ft., to include vocational department, and will call for new bids in the spring. It is estimated to cost about \$150,000. John Latenson & Sons, 633 Peters Trust Building, Omaha, Neb., are architects. Roy F. Freeman is secretary of the board.

The Common Council, Naperville, Ill., has plans under way for its municipal electric light and power plant addition to cost about \$50,000.

A vocational department will be installed in the two-story and basement high school to be erected at Olivia, Minn., estimated to cost about \$160,000. W. L. Alban, Endicott Building, St. Paul, Minn., is architect. George E. Peterson is clerk of the board.

Baltimore

BALTIMORE, Jan. 16.

The American Concrete Tile & Products Co., 305 Gaither Building, Baltimore, recently organized with a capital of \$250,000, has plans under way for new works, estimated to cost about \$55,000. The machinery will cost approximately \$25,000. Work will commence at an early date. John E. Springer is president, and John W. Ritter, secretary and treasurer.

The Market Mfg. Co., 1021 Cathedral Street, Baltimore, will soon take bids for a machine shop and automobile service works, 50 x 85 ft., estimated to cost about \$22,000.

An ice-manufacturing plant will be constructed by the Southern Maryland Co-Operative Creamery Association, Waldorf, Md., recently organized, plans for which are being prepared by J. E. Withnall, architect, Waldorf. James P. Ryan is president.

The Revenue Department, Baltimore, Charles H. Holtzman, collector of the port, will install electric weighing machinery and other equipment, estimated to cost about \$100,000, at the new plant of the American Sugar Refining Co., now nearing completion, for Government inspection work. It is announced that the plant will be ready for operation on March 15.

The Yingling Auto & Carriage Works, Lee Street, Hagerstown, Md., has construction in progress on a one-story shop, 50 x 120 ft., at 237-43 Frederick Street. Harry Yingling is head.

The Veterans' Bureau, Washington, Col. Charles R. Forbes, director, will operate a large automobile instruction school at Camp Holabird, Md. The present Government automotive plant at this place will be utilized, with departments for every feature of car and motor truck work.

including parts manufacture, assembling, repairs, etc. It is expected to have accommodations for about 500 students.

The Red Ash Fuel Co., 315 Wyoming Street, Bluefield, W. Va., will install electrically-operated mining machinery, mechanical draft equipment, mine cars and other machinery at its properties at Red Ash, Va., estimated to cost in excess of \$150,000. Bids will be asked within a few weeks. D. C. Yates is president and manager.

Fire, Jan. 2, destroyed the mechanical department and equipment at the plant of the Electric City Brick Co., Augusta, Ga., with loss estimated at about \$25,000.

The Jarvis Storage Battery Co., 229 South Liberty Street, Winston-Salem, N. C., has awarded a contract to the E. E. Kinnoman Co., Winston-Salem, for a one-story plant, 70 x 100 ft. G. C. Jarvis is president.

The Board of Education, Commercial Building, Charlotte, N. C., will build a new two-story vocational school, estimated to cost about \$100,000. The Northeastern Construction Co., Charlotte, is contractor; C. C. Hook, Trust Building, is architect.

The City Council, Danville, Va., is planning for the installation of new machinery at the municipal power plant, including turbine, boilers and auxiliary operating equipment.

The Universal Heater & Mfg. Co., Waynesboro, Pa., C. W. Sexton, president, manufacturer of heating equipment, sheet metal products, etc., will establish a branch plant at 201 North College Street, Charlotte, N. C. Operations will commence at an early date.

The Cullowhee Normal & Industrial School, Cullowhee, N. C., is having plans prepared for a two-story and basement school, 50 x 200 ft., estimated to cost about \$100,000. Nelson & Cooper, Commercial Bank Building, Raleigh, N. C., are architects. A. C. Reynolds is president in charge.

The Hackney Brothers' Co., Wilson, N. C., will rebuild its automobile body and wagon plant, recently destroyed by fire with loss estimated at about \$350,000. T. J. Hackney is manager.

The State Board of Prison Control, Baltimore, Md., Robert D. Case, secretary, has asked bids for the erection of a workshop at the Maryland House of Correction to cost about \$40,000.

Plans are being considered by the city officials, Baltimore, Md., for the establishment of a central machine shop for repair work. Henry G. Perring, City Hall, is chief engineer.

Cleveland

CLEVELAND, Jan. 16.

The volume of machine-tool business and inquiries shows an improvement over December, but few orders are being placed for more than single machines. There is more activity in the Detroit market where the General Motors Corporation has placed six large horizontal boring mills, and a like number of machines have been purchased by a manufacturer of automatic brakes. A local machinery house reports that during the past 30 days it has received from the Detroit territory, mainly from the automotive industry, inquiries for machine tools aggregating approximately \$250,000, ranging from single machines up to one lot of 25 to 30 tools. While these are regarded as live inquiries, no reliable estimate can be made as to how much of the prospective business will be placed. Reports from Detroit indicate that some dealers are offering unusually liberal terms of payment to effect sales. The Toledo Metal Furniture Co., Toledo, Ohio, is inquiring for two punch presses.

The crane market continues quiet. The National Supply Co., Toledo, has an inquiry out for two 5-ton traveling cranes.

The Sterling Brass Co., 4612 St. Clair Avenue, Cleveland, maker of plumbers' brass goods, will erect a new one and two-story plant at 9600 St. Catherine Avenue which will include a foundry and machine shop providing 40,000 sq. ft. of floor space. The company advises that it will purchase about \$50,000 worth of machinery, including foundry equipment and brass working machine tools.

The Visible Pump Co., which has been operating a temporary plant at Ft. Wayne, Ind., will locate in Findlay, Ohio, where it will occupy a portion of the former Grant motor car plant. It is expected that operations will begin about Feb. 1. F. B. Rohrer is president and a number of Findlay and Ft. Wayne men are interested.

The Lima, Iron & Brass Foundry Co., Lima, Ohio, has under consideration plans for enlarging its plant and adding a malleable iron foundry. It also has under consideration a proposal to remove its plant to St. Marys, Ohio.

It is reported from Akron, Ohio, that Fred Claus and

Fred Meyers, formerly general manager and factory superintendent respectively, of the Cleveland Welding Division of the Hydraulic Pressed Steel Co., are planning to establish a plant in that city to manufacture steel bases for solid automobile tires and detachable and demountable rims for pneumatic tires.

The Pacific Tractor & Machinery Co., Bucyrus, Ohio, has been incorporated as a preliminary step to the formation of its sales organization for marketing a caterpillar type of tractor truck for small tractors, designed by C. A. Henneuse, formerly president Henneuse Tractor Co., Sacramento, Cal. The truck assembly or tractor truck is being made by the Hadfield-Penfield Steel Co., Bucyrus.

Fire recently destroyed the plant of the Canton Rim Co., Louisville, Ohio, causing a loss estimated at \$100,000.

Detroit

DETROIT, Jan. 16.

The Ford Motor Co., Detroit, has awarded contract to Everitt Winters, 742 Book Building, for one-story addition at River Rouge, 68 x 484 ft., with lean-to extension, 60 x 230 ft.

The Willys-Overland Co., Toledo, Ohio, will concentrate operations at the plant of the Wilson Foundry & Machine Co., Pontiac, Mich., a subsidiary, for the manufacture of motors for the Willys-Knight automobiles. The plant will be enlarged and considerable equipment removed from the Willys-Overland works at Elyria, Ohio, for installation. It is expected to adopt the increased operating schedule early in February. The Willys company will utilize two of the buildings of the former Flanders automobile plant at Pontiac for the assembling of Willys-Knight motors, and equipment for this purpose will be provided.

The Board of Education, City Hall, Grand Rapids, Mich., is taking bids until Jan. 30, for the erection of the first unit of its proposed new vocational training school, to be four-story, 100 x 175 ft., and estimated to cost about \$275,000. Williamson, Crow & Proctor, 511 Guilbert Building, are architects; W. W. Bradfield, Michigan Trust Building, is mechanical engineer. H. N. Morrill is business manager for the board.

The Champion Ignition Co., Flint, Mich., manufacturer of spark plugs and other ignition equipment, is planning to devote a portion of its plant to the manufacture of speedometers and parts, and complete precision machinery will be provided for this purpose. Albert Champion is president.

The Gagnier Stereotype Co., 525 Howard Street, Detroit, is having plans drawn for the erection of a new one-story foundry, 30 x 100 ft., on McKinstry Street, near Plumer Street, estimated to cost about \$60,000. Kasurin Brothers, 512 Empire Building, are the architects. Edmond Gagnier is president.

The Kalamazoo Sanitary Mfg. Co., Factory and Alcott streets, Kalamazoo, Mich., has completed plans for the erection of its proposed plant addition, but work will be held in temporary abeyance. The factory will be two stories, 122 x 400 ft., and is estimated to cost about \$200,000, including equipment.

The Oakland Motor Car Co., Pontiac, Mich., has just completed an addition to the motor plant at a cost of approximately \$500,000. This addition has added 200,000 ft. of floor space for manufacturing purposes. In all the plants of the Oakland Motor Car Co. there is a total of 1,270,500 sq. ft. of floor space. This area composes the entire floor space of the eight plants of the company at Pontiac and extends over a plot of land of approximately 28 acres.

Indiana

INDIANAPOLIS, Jan. 16.

The Reliance Foundry Co., Richmond, Ind., is having plans drawn for a new one-story foundry, 85 x 110 ft., estimated to cost \$30,000. J. Mueller & Co., Palladium Building, are architects.

The Board of Education, New Castle, Ind., will take bids about Feb. 1, for a two-story high school, 190 x 220 ft., to include a vocational department, estimated to cost \$300,000. Herbert Foltz, 843 Lemcke Annex, Indianapolis, is architect. Martin L. Koons is president of the board.

The Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis, has tentative plans under way for an addition to its electric power plant, with installation to include two 30,000 kw. generators and auxiliary operating machinery. The expansion is estimated to cost \$1,000,000. The company has commenced the construction of an addition to its plant at Terre Haute, and a 10,000 kw. generating

unit will be installed at this station, with other machinery to bring the expenditure up to about \$400,000.

The Peille Co., Richmond, Ind., manufacturer of metal fireproof doors, etc., has awarded contract to the C. C. Heinemann & Sons Co., Marion, Ind., for a new two-story plant, 250 x 500 ft., estimated to cost in excess of \$150,000, including equipment.

The J. H. Krespe Tin & Sheet Iron Works, 512 West Franklin Street, Indianapolis, is having plans drawn for a one-story building, 85 x 80 ft. Anderson & Stingle, 110 Upper Fourth Street, are architects.

The Board of Works, Hammond, Ind., will call for bids early in the spring for a new electrically-operated pumping plant, estimated to cost about \$90,000 with machinery. W. F. Bridge, Rimbach Block, is engineer. A. G. Kinert is city clerk.

The American Car & Foundry Co., Terre Haute, Ind., will build a new one-story power house, 50 x 70 ft.

The Board of Education, Plymouth, Ind., has commissioned Ernest W. Young, 512 Dean Building, South Bend, Ind., architect, to prepare plans for a new two-story junior and senior high school, including vocational department, estimated to cost about \$300,000. Jacob Schlosser is president of the board.

The Board of Sanitary Commissioners, City Hall, Indianapolis, has preliminary plans under way for a one-story power house, in connection with a new sewerage disposal plant, with total cost estimated at \$300,000. Charles H. Hurd, 1405 Merchants' Bank Building, is engineer.

The D. V. Reedy Elevator Co., Indianapolis manufacturer of passenger elevators, will erect a new plant at 520-522 South New Jersey Street, two-stories, 44 x 202 ft. A steel hoisting crane will be part of the equipment.

The Peerless Metal Products Co., Chicago, manufacturer of metal articles, has leased space at 109 West Tenth Street, Indianapolis, and expects to have it in operation within a month. A. E. Shirley, of Shirley Brothers, Indianapolis, is president of the company; J. A. Spahn, vice-president and Joseph P. Hanley, secretary-treasurer.

Cincinnati

CINCINNATI, Jan. 16

There have been few developments in the machinery market the past week. While the number of orders booked has been small, an undercurrent of optimism exists among manufacturers and dealers regarding the immediate future, and it is expected that before the winter is over a larger operation of plants will be seen. Most of the orders booked are for single machines and come from widely scattered points. The Delaware, Lackawanna & Western is understood to have closed on its list of 40 tools. The Seaboard Air Line has bought some tools in addition to the list closed several weeks ago. A local manufacturer reports the receipt of a large order from Australia for small electrical tools. This is the first from this source in 16 months. The same firm also received a substantial order for Japan General export business, however, is very quiet, although a local manufacturer recently booked an order from France. No new inquiries of consequence have been noted the past week, although a prospect in the immediate future will be the William Powell Co., valve manufacturer, Cincinnati. It has not yet made up its machinery requirements, but is expected to be in the market shortly for miscellaneous machines.

The William Powell Co., Cincinnati, valve manufacturer, has purchased the former plant of the Cincinnati Grinder Co. on Colerain Avenue, and will, after alterations are completed, equip it for the manufacture of iron valves. The present plant will be devoted entirely to the manufacture of brass valves and fittings. The property acquired contains 36,000 sq. ft. of floor space and the purchase also includes a number of cranes now installed for the handling of heavy material. Eventually the directors contemplate building a foundry to manufacture their own castings.

Seattle

SEATTLE, Jan. 9.

The City Council, McMinville, Ore., has preliminary plans under way for a hydroelectric generating plant on the Nestucca River. It will consist of two units and is estimated to cost about \$250,000.

The Tacoma Ice & Refrigerating Co., South Twenty-sixth Street, Tacoma, Wash., is arranging for the erection of a new five-story ice-manufacturing and refrigerating plant at South Twenty-sixth and Helgate streets, estimated to cost about \$350,000, including machinery.

The Pacific Spruce Corporation, Toledo, Ore., will soon

begin operations at the former Government lumber mill in this section, recently acquired, and has plans under consideration for an addition to be equipped as a box factory and general planing mill.

Electric motors and other power equipment will be installed in the three-story printing plant, 100 x 100 ft., to be erected by the Telegram Publishing Co., Washington and Park streets, Portland, Ore. It is estimated to cost about \$160,000. Rasmussen & Grace, Chamber of Commerce Building, are architects and engineers.

The Columbia Wood Products Co., Rainier, Ore., recently organized with a capital of \$250,000, has acquired a local site for new works, estimated to cost \$100,000, with machinery. Plans for the initial unit have been completed.

J. H. Johnson, Tillamook and Hancock streets, Portland, Ore., has made application for permission to build a one-story machine shop and automobile repair works.

The Central South

ST. LOUIS, Jan. 16.

The Cape Girardeau Portland Cement Co., Cape Girardeau, Mo., will make extensions and improvements in its plant, including the installation of new power equipment, estimated to cost close to \$150,000. New grinding machinery and other equipment will be installed in the cement mill. Charles L. Harrison is president.

The Harper Oil & Refining Co., Henryetta, Okla., recently organized, with a capital of \$200,000, has concluded negotiations with the Chamber of Commerce for the purchase of 10 acres in the western section of the city for a new refinery, estimated to cost about \$100,000. Plans have been prepared and work will commence soon.

The Board of Education, Marshall, Mo., has selected Owen, Payson & Carswell, architects, 505 Interstate Building, Kansas City, Mo., to prepare plans for a new high school, to include vocational department, estimated to cost about \$250,000.

The Muskogee Vitrified Brick Co., Muskogee, Okla., has plans under way for a new plant, 60 x 150 ft., to replace its works recently destroyed by fire. It is estimated to cost about \$35,000. Frank A. Nicholson is president and manager.

The Nance Mfg. Co., Dederlock Building, Knoxville, Tenn., is considering the establishment of a new factory to manufacture stamped metal products.

The St. Louis & San Francisco Railroad Co., St. Louis, is planning for extensions and improvements in its repair shops at Enid, Okla.

The City Council, Bristol, Tenn., has preliminary plans under way for a municipal hydroelectric generating plant on the Holston River. W. H. Rouse, mayor, is in charge.

The Belknap Hardware & Mfg. Co., Second and Washington streets, Louisville, is completing plans and will soon commence the erection of a building at its works, estimated to cost in excess of \$1,000,000. Graham, Anderson, Probst & White, Railway Exchange Building, Chicago, are architects.

The Board of Education, Eighth and Chestnut streets, Louisville, has selected D. X. Murphy & Brothers, architects, Louisville Trust Building, to prepare plans for an addition to the local vocational school, estimated to cost about \$50,000. J. N. Bloom is president of the board.

The Knoxville Cement Products Corporation, Knoxville, Tenn., recently organized, has acquired buildings and will install equipment for the manufacture of brick, blocks, tile and kindred products. C. P. Koehn is president and general manager.

Cosden & Co., 120 Broadway, New York, are planning for additions to their oil refinery at Tulsa, Okla., estimated to cost in excess of \$1,000,000, including equipment.

The Profit-Sharing Ice Co., Chattanooga, Tenn., will build a new one-story ice-manufacturing plant with capacity of about 50 tons per day. Bowdre Brown is president.

The Common Council, Okeene, Okla., is perfecting plans for enlargement of the municipal electric light and power plant, to include the installation of new equipment, estimated to cost about \$40,000. Louis Vogt is mayor.

The Pine Bluff Compress & Warehouse Co., Pine Bluff, Ark., has awarded contract to M. M. Redman, Pine Bluff, for an addition to its plant to cost about \$50,000.

The Doe River Sand Co., 208 Main Street, Johnson City, Tenn., is planning for the installation of machinery at its properties on the Doe River, including washing and screening equipment, elevator and hoist, power equipment, cars, etc. The company was incorporated recently. R. N. Campbell is president.

The Missouri & Pacific Railroad Co., St. Louis, has

awarded contract to T. S. Leake & Co., 608 South Dearborn Street, Chicago, for a new engine house and shop at Holisington, Kan.

The Board of Education, Independence, Kan., is taking new bids on revised plans for a two-story and basement junior high school, with vocational department, 150 x 200 ft., estimated to cost approximately \$200,000. N. S. Spencer & Son, 39 West Van Buren Street, Chicago, are architects.

The National Hardwood Co., 618 Bryant Building, Kansas City, Mo., has awarded contract for a new plant, 40 x 160 ft., to include band saw, finishing machinery and other wood-working equipment. J. W. Hoffman is president.

Peers & McGilone, Pine Bluff, Ark., manufacturer of automobile spokes, have had plans prepared for an addition to develop a daily capacity of about 30,000 spokes. Work will commence at once.

The Atoka Public Service Co., Atoka, Okla., is considering plans for a new one-story ice-manufacturing works, estimated to cost about \$50,000.

Henry Pilcher's Sons, Louisville, Ky., manufacturers of pipe organs, are in the market for universal swing boring machine, with a radius of 7 ft., the drill head to be equipped with a positive stop and steady enough that it may be used for counter sinking.

Milwaukee

MILWAUKEE, Jan. 16.

Although neither inquiry nor buying has assumed proportions that ordinarily would give the machine-tool market a tone of activity, a recovery from the low point reached during the holidays has set in. The situation the past week was better than that through December, and is reminiscent of the comparatively active days of October and November. It is confidently believed that from now until spring there will be slow but steady betterment, judging by the scope of requirements already in prospect, but probably not yet apparent on the surface. Boot and shoe industries and makers of textile machinery and equipment are seeking some tools. Automotive industries have not yet resumed buying, but inquiry is increasing due to the good results growing out of the national expositions in the way of distribution of 1922 production. One of the most encouraging features is the return of optimism to the agricultural implement trade, which is expected to develop some new tool requirements within a short time.

The Allis-Chalmers Mfg. Co., Milwaukee, has booked an order for a turbine and generator unit, involving about \$250,000, from the Daido Hydro-Electric Co., Nagoya, Japan.

The Bullard Mfg. Co., Madison, Wis., has been incorporated with a capital stock of \$25,000 by Earl J. Bullard, Jessie M. Bullard and Lucille E. Brown, to manufacture patented mechanical specialties designed by Mr. Bullard, especially a piston ring. It is intended to establish a plant eventually, although for the present production will be effected under contract. Offices have been established at 219-220 Washington Building.

The Raymond Mfg. Co., Milwaukee, a new \$30,000 corporation, organized to manufacture automotive accessories and parts and mechanical specialties, has acquired a site on Richards Street, near the northern city limits, and will build a one-story brick machine shop, 40 x 60 ft., which will require a small complement of machinery, with individual electric motor-drive, served by purchased current. Charles S. Raymond, 77 Cawker Building, is president.

The Hartford Tool & Machine Co., Hartford, Wis., has plans for a new one-story machine shop, 50 x 90 ft., which will be built early in the spring to replace the one destroyed by fire recently. The investment will be about \$25,000, including equipment. Fred F. Jordan is proprietor.

M. R. Carpenter, 105 North Clark Street, Chicago, architect and engineer, is preparing plans for an artificial ice plant, 50 x 100 ft., one-story, to be erected at Beloit, Wis., for an unidentified local interest. The cost will be \$40,000.

The New-Way Mfg. Co., Eau Claire, Wis., manufacturer of concrete mixers and other building and construction equipment, has decided to move to Chippewa Falls, Wis., where a site has been acquired for a new machine and assembling shop, 50 x 100 ft. The contract for erecting the shop has been let to Tschopp, Dorch & Camastral, local contractors. For the present only a small list of additional equipment will be purchased. A. H. Behrens is vice-president and general manager.

The Board of Education, District No. 2, West DePere, Wis., will take bids about Feb. 10 for a new high school and vocational training institute, 76 x 130 and 60 x 135 ft., two stories and basement, designed by Foeller, Schober & Benton, architects, Green Bay, Wis. The cost is estimated at \$210,000, including all equipment. James J. Hughes is secretary of the board.

The Board of Education, Eau Claire, Wis., will proceed with the erection of a new high school, to contain manual training and domestic science facilities. Competitive plans are being asked from architects. The appropriation amounts to \$500,000. Miss Emma Schroeder is clerk of the board.

The Board of Education, Birchwood, Wis., has let the general contract to Schaefer & Olson, Chippewa Falls, Wis., for a new high school and vocational training institute to cost about \$175,000. The architect is Edward Tough, Madison, Wis.

The Farmers Produce Co., Chippewa Falls, Wis., will build a \$60,000 addition to its store and warehouse, to be used principally for cold storage purposes. It will be four stories and basement, 30 x 132 ft., and will require an artificial ice producing unit, new boilers, etc. Fred Anderson, 15 West Central Street, is general manager.

California

SAN FRANCISCO, Jan. 9.

The Durant Motors Co., Oakland, Cal., a subsidiary of Durant Motors, Inc., New York, is awarding a number of sub-contracts for its new two-story plant, at East Fourteenth Street and the city limits, 800 x 800 ft., including four wings. Work is under way. It is estimated to cost about \$750,000, including machinery. The P. J. Walker Co., Monadnock Building, San Francisco, has the general contract. H. J. Brunner, Sharon Building, San Francisco, is engineer.

A. B. Atkinson, head of the Oak Park Lumber Co., Sacramento, Cal., is organizing a company to build and operate an ice and cold storage plant. Plans have been prepared for a building, estimated to cost about \$30,000, including machinery.

The American Aluminum-Metal Products Co., Los Angeles, is taking bids through Richard D. King, architect, 519 Van Nuys Building, for its new plant at Burbank. It will consist of seven buildings and is estimated to cost in excess of \$100,000.

The Union Ice Co., 354 Pine Street, San Francisco, is completing arrangements for a one-story ice-manufacturing plant at Napa, Cal., estimated to cost about \$50,000. W. H. Toepke, 942 Market Street, San Francisco, is architect.

The Washington Iron Works, 1946 Sacramento Street, Los Angeles, has awarded a contract to John F. Kuhns, 810 Federa Street, for a one-story building, 135 x 167 ft., at Eighth and Mateo streets, estimated to cost about \$26,000.

The Industrial Mfg. Co., Lodi, Cal., recently organized with a capital of \$200,000, is planning for the establishment of a works to manufacture pumping machinery and parts. Dean H. Thompson and William C. Allen, both of Lodi, head the company.

The George H. Dorrman Steel Co., Monadnock Building, San Francisco, has leased a building on Adeline Street, Oakland, Cal., totaling about 15,000 sq. ft., for extensions.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, a subsidiary of the Southern Pacific Railroad Co., will commence the immediate erection of a new ice-manufacturing and railroad car precooling plant at Calwa, Cal., estimated to cost about \$85,000.

The Merced Irrigation District, Merced, Cal., has commissioned R. C. Starr, engineer of the San Joaquin Light & Power Corporation, Fresno, Cal., to prepare plans for its hydroelectric generating plant on the Merced River, estimated to cost in excess of \$1,500,000.

The Westinghouse Electric & Mfg. Co., Los Angeles, is having plans prepared for a six-story, reinforced-concrete distributing building, 170 x 239 ft., at Fifth and San Pedro streets, estimated to cost about \$700,000, with equipment, which will include five traveling cranes, eight elevators, trucks and other material-handling and conveying equipment. Noerenberg & Johnson, Los Angeles Railway Building, are architects.

The Gulf States

BIRMINGHAM, Jan. 16.

The Chickasaw Shipbuilding & Car Co., Mobile, Ala., a subsidiary of the United States Steel Corporation, is arranging to discontinue shipbuilding work and will devote the entire plant to the manufacture of railroad cars. The initial work will be 2000 cars for the Seaboard Air Line.

The Southwestern Gas & Electric Co., Shreveport, La., will install a new generating unit and auxiliary operating equipment. The work is estimated to cost \$150,000.

The Valley Tile & Concrete Co., San Benito, Tex., recently organized, has acquired a site and will establish a plant for the manufacture of tile and kindred products. Machinery

will be installed at an early date. G. W. Wilkerson is president.

The Texas Automotive Co., Dallas, Tex., will operate a machine and repair department for heavy work on the third floor of the building now occupied. J. H. Roach is president.

At a special election, Jan. 8, citizens of Vernon, Tex., approved a bond issue of \$100,000 for an electric light and power plant.

The Orange Water, Ice & Light Co., Orange, Tex., will commence work immediately on the enlargement of its electric power plant with the installation of new machinery estimated to cost about \$50,000.

The City Council, Orlando, Fla., has preliminary plans in preparation for additions and improvements in the municipal electric light and power plant, estimated to cost in excess of \$100,000.

The Common Council, Wellington, Tex., has plans nearing completion for the erection of a municipal electric light and power plant to cost about \$50,000. Bonds for this amount recently were approved.

The Stacy Co., Dallas, Tex., is considering the purchase of a site for the erection of a new plant for the manufacture of cotton cleaning machinery and parts. The company recently increased its capital to \$50,000.

The Osceola Cypress Co., Osceola, Fla., is planning for the purchase of a 10-ton locomotive crane.

A vocational training department will be installed in the new high school to be erected by the Board of Education, Orlando, Fla. Preliminary plans are being prepared.

Crescent City, Fla., is planning for the erection of an addition to the municipal electric power plant. A. B. Harbison is chairman of board of trustees.

The Atchison, Topeka & Santa Fe Railroad is reported to be planning for additions and improvements in its repair shops at Cleburne, Tex.

The Edna Light, Ice & Water Co., Edna, Tex., has plans nearing completion for extensions in its local electric power plant, to include new engine, generator, switchboard and other electrical equipment. Rudolph Linnartz is secretary and manager.

Paris, Tex., is planning for the installation of a complete waterworks plant and system to cost about \$1,000,000. It will include an electrically-operated pumping plant and purification works, with capacity of 3,000,000 gal.; water tank and tower with capacity of 4,000,000 gal.; and about 4½ miles of cast iron pipe of various sizes. John B. Hawley, Calton Exchange Building, Fort Worth, Tex., is consulting engineer for the project.

Canada

TORONTO, Jan. 16.

The machine tool market in this section is slowly reviving after the period of stagnation during the past month. While sales are still confined to one or two tools, buyers are beginning to enter the market in larger numbers. The chief buying, however, is for replacement purposes. Industrial interests which are preparing to establish plants in the Dominion have not advanced far enough with their programs to enable them to enter the market and as a consequence equipment buying is being deferred, but these interests are sending out inquiries and are receiving such data as will enable them to buy when the time comes. The Canadian National Railways is entering the market from time to time with small lists, but has not resumed buying on a large scale. A limited amount of equipment is also going to automobile plants for renewal purposes, and while it is a fact that several large automobile works are underway in Ontario and Quebec they have not entered the market or placed orders for the machinery which will be required. The demand for small tools is making some headway and while consumers are not buying in large quantities, they are entering the market frequently for small lots.

The Town Council, Wlarton, Ont., plans the installation of an electric pump and engine for the waterworks plant to cost \$10,000.

J. D. Best, Glencoe, Ont., is in the market for equipment for drilling oil wells.

Gropp Brothers, Penetanguishene, Ont., are in the market for sawmill machinery, boiler, engine, etc.

W. W. Avey, Norwich, Ont., is in the market for equipment for a planing mill, including engine, boiler, etc.

IRON AND INDUSTRIAL STOCKS

Values in General Have Improved During the Past Week

Iron and security values in general have improved the past week on a resumption of moderate investment buying. Renewed investment confidence evidently is based on something beyond further increases in idle freight cars, the many price adjustments on manufactured iron, steel and cotton products, the continued lack of commodities buying in volume, the late developments in international affairs, and the other straws that point to the fact that domestic industrial affairs are still in a very mixed and uncertain condition. That something apparently is based on the money market. Time and commercial paper money rates in the East have dropped below the 5 per cent level for the first time in more than four years, and Federal Bank discounts also are lower in the East. All of which means frozen credits are nearing the vanishing point, and idle money is growing more and more a problem with Eastern bankers. Nothing breeds good business more quickly than surplus funds in banks. Sooner or later, the easier money will spread from East to West.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal. com.. 38¼-39½	Int. Har. com... 79½-82
Allis-Chal. pf... 88-90	Int. Har. pf..... -106
Am. Can. com... 32¼-34¼	Lack. Steel..... 44½-46½
Am. Can. pf... 94¼-97¼	Midvale Steel... 28½-30½
Am. C. & P. com. 141-146	Nat.-Acme..... 10½-11½
Am. Loco. com.. 102½-105½	Nat. E. & S. com. 30½-34½
Am. Loco. pf... 112-113	Nova Scotia Stl. 23½-24½
Am. Rad. com.. 83¼-84	Press. Steel com. 63-64
Am. Stl. F. com. 31½-33	Rv. S. Spr. com. 94-96½
Am. Stl. F. pf... -96½	Replique Steel... 26½-28½
Bald. Loco. com. 92½-96½	Republic com.. 51½-53½
Bald. Loco. pf.. 104-104½	Republic pf..... -85
Beth. Steel com.. 51-52	Sloss com..... 36-36½
Beth. Stl. Cl. B. 55½-58½	Superior Steel... -26½
Beth. Stl. 8% pf. 105-106	Un. Alloy Steel.. 25-26½
Chic. Pnen. Tool 60-60½	U. S. Pipe com.. 16½-16½
Colo. Fuel..... 24-25½	U. S. Pipe pf... 50-51
Cruc. Steel com.. 59½-65	U. S. Steel com. 82½-84½
Cruc. Steel pf... 80½-82	U. S. Steel pf... 115-118
Gen. Elec. 136-141	Vanadium Steel. 30¼-31½
It. No. Ore Cert. 31½-32	Va. I. C. & C.... 86-87½
Gulf States Steel 44½-51½	Westhouse Elec. 49¼-50¼

Wire Goods Co. Increases Capital

Notification has been made to the Massachusetts commissioner of corporations by the Wire Goods Co., Worcester, Mass., of an increase in the capital stock from \$125,000 to \$1,000,000, by an issue of 8750 new shares, par \$100. Of the new stock, 4836 shares will be issued as a stock dividend.

The increase in capitalization primarily is for the purpose of absorbing the stock capitalization of the Cassidy, Fairbanks Co., Chicago, the Andrews Wire & Iron Works, Rockford, Ill., and the Andrews Wire Works, Ltd., Walford, Ont. Final action on the merger of these three companies with the Wire Goods Co. will be taken this week, upon the return of Reginald Washburn, president Wire Goods Co., from the West. The Washburn interests for some time have been credited with owning a substantial interest in the involved three companies. Present plans call for the operation of the four plants under a Massachusetts charter.

Industrial Finance

The plant of the Franklin Tractor Co., Greenville, Ohio, in liquidation, will be sold at public auction on Jan. 24, this decision having been come to at a meeting of the creditors of the company. The entire plants will be sold, including buildings and equipment.

The Federal Court, Detroit, has issued an order authorizing the receivers for the Lincoln Motor Corporation, Detroit, manufacturer of automobiles, to offer the plant at Warren and Livernois streets and property of the company at auction on Feb. 4. The court has placed a minimum price of \$8,000,000 on the assets.

The Peninsular Milled Screw Co., of Detroit, has increased its capitalization from \$35,000 to \$400,000.

The H. S. Lee Foundry & Machine Co., of Plymouth, Mich., has increased its capitalization from \$50,000 to \$100,000.

Altamus & Prindle, steel and iron products, ores and ferroalloys, Grand Central Terminal, New York, have been appointed eastern representatives of the Steel Plate Products Co., Pottstown, Pa.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.53c.
Swedish bars, base price.....	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Bands, base price	3.13c.
Beams and channels, angles and tees	
3 in. x ½ in. and larger, base.....	2.63c.
Channels, angles and tees under 3 in. x	
¾ in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.50c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	2.70c.
Toe calk, ½ x ¾ in. and larger.....	3.20c.
Cold-rolled strip, soft and quarter hard..	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex.	3.95c.
Standard cast steel, base price.....	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¾ in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.65c. to 3.80c.	.....
Nos. 22 and 24	3.70c. to 3.85c.	4.10c.
No. 26	3.75c. to 3.90c.	4.15c.
No. 28	3.85c. to 4.00c.	4.25c.
No. 30	3.10c. to 4.25c.	.....
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20.....	4.25c. to 4.40c.
Nos. 22 and 24.....	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel

	Black	Galv.		Black	Galv.
¾ in. Butt... ..	—56	—40	¾-in. Butt... ..	—30	—13
¾ in. Butt... ..	—61	—47	1½-in. Butt... ..	—32	—15
1-3 in. Butt... ..	—63	—49	2-in. Lap... ..	—27	—10
3½-6 in. Lap.	—60	—46	2½-6-in. Lap.	—30	—15
7-8 in. Lap... ..	—56	—34	7-12-in. Lap... ..	—23	—7
9-12 in. Lap... ..	—55	—33			

Wrought Iron

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17½c. to 17½c.
High brass wire	17½c. to 17½c.
Brass rod	14½c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless .....	.....

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14-20	Primes	Wasters
			80 lb....	\$6.05	\$5.80
			90 lb....	6.15	5.90
			100 lb....	6.25	6.00
IC..	\$10.00	\$8.50	IC...	6.40	6.15
IX..	11.25	10.00	IX...	7.40	7.15
IXX..	13.00	11.50	IXX...	8.40	8.15
IXXX..	14.75	13.25	IXXX...	9.40	9.15
IXXXX..	16.25	15.00	IXXXX...	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10¼c. open 11c.

Lead and Solder*

American pig lead	5½c. to 6¼c.
Bar lead	6½c. to 7 c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.
Grade D, per lb.

Antimony

Asiatic	6½c. to 6¼c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	26c. to 28c.
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Old Metals

The market is quiet with a strong undertone. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible.....	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition.....	3.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc.	2.50

THE IRON AGE

New York, January 26, 1922

ESTABLISHED 1855



Sheet Mill of the Otis Steel Company

Features Include Staggered Arrangement of Furnaces—Powdered Coal Used—Plant Notable for Its Applications of Modern Equipment and Design

THE new sheet mill plant of the Otis Steel Co., Cleveland, built as an extension of its Riverside Works, has a number of distinctive features. Among the most prominent is the arrangement for the convenient handling of material, and consequently, the economy in operation. The bar storage department is located at the side of the furnace and mill departments directly back of the furnaces, which reduces the amount of handling of raw material. Sheet bars in storage under roof are taken to the bar shear as required and on leaving the shear the crane places them back of the pair furnaces. Rolled sheets go from the hot mills to the squaring shears on the opposite side of the mill building, and from there to the shear bay back of the shears, where ample storeroom is provided, so they can be left here in storage until they are wanted in the cold rolling and annealing department. The plant is entirely electrically operated.

The excellent lighting of the plant is another important feature. The buildings are arranged and the roof designed so that more daylight is admitted than in mill buildings of the more common design. Although there are four adjoining buildings, making virtually one building 231 ft. wide, considerable wall surface is provided for continuous window sections along the connecting sides of the buildings. The daylight thus admitted supplements that which enters through the continuous windows in the outer side walls.

The plant is a flexible one designed for making all kinds of sheets and in all finishes, its product including full finished sheets for the automobile trade. With this new sheet mill as an addition to its other plants, the company is equipped to make a line of mill products

extending from heavy plates down to sheets in the lightest gages.

The new plant is an eight hot mill plant with the mills arranged in two trains with separate drives and each finishing mill has its own roughing stand. Powdered coal is used for fuel both in the sheet and pair furnaces and in the annealing furnaces. With the plant arrangement back travel of material is avoided and the amount of handling required in the movement of sheets up to the time they reach the shipping platform appears to have been reduced to a minimum. From the squaring shears sheets are carried in a straight line to the adjoining cold rolling and annealing building, which is virtually an extension of the shear and mill buildings. On one side of the annealing building is the pickling department close to the mills. The annealing furnaces extend along the building beyond the pickling department and are a considerable distance from the hot mills. Connected to the annealing department on the opposite side is the warehouse. The shipping platform as well as the bar storage department are under cover.

The main mill building is 90 ft. wide. On one side is the bar storage building, 75 ft. wide, and connecting the two is a leanto 28 ft. wide in which are located the sheet and pair furnaces. Adjoining the mill building on the opposite side is the shear department, 40 ft. wide. These connected buildings are 456 ft. in length.

Extending from the lower end of the shear and mill building, to which it is connected, is the annealing and cold rolling department, that occupies a building 80 x 500 ft. On one side of this is a leanto 31 ft. 6 in. x 340 ft., in which the annealing furnaces are located,

and attached on the same side is the pickling department, 50 x 120 ft. The warehouse adjoining the annealing department on the opposite side is 75 x 380 ft.

Sheet bars are brought into the bar storage department on a depressed railroad track that extends the length of this building on the outer side. The building is served by a 10-ton traveling crane. Near the center is a United Engineering & Foundry Co. bar shear driven by a 25-hp. motor. Sheet bars are delivered to an inclined skid table 36 ft. long, from which they are moved to an adjoining roller table that serves the bar shear. Back of the shears is a cradle in which the sheared bars are piled, a man with a hook arranging these in four stacks as they pass from the shear to

with the finishing and roughing stands alternating. Each train is composed of 33 to 56-in. mills, all rolls being 30 in. in diameter. This gives a capacity for rolling sheets up to 48 in. in width. Two of the roughing mills have top rolls balanced with electrically operated screw downs operated by 50-hp. motors. These stands are used for rolling sheets in the heavier gages. All mills were supplied by the Mackintosh-Hemphill Co., Pittsburgh, except the rolls, which were made by the Otis company.

Each mill train is driven by an Allis-Chalmers 1000-hp. induction motor operating at 250 r.p.m. and located in the center of the mill train. The speed of the rolls is reduced to 32 r.p.m. through a Falk her-



The Charging End of One of the Double Continuous Pair Furnaces and the Electrically Operated Charging Device. Back of the column at the left is one of the sheet furnaces and the fuel supply line that connects to this furnace. Above is one of the powdered coal bins

the cradle. The cradle has a capacity of approximately 250 bars. When the cradle is full a chain or rope is swung around the packs and the crane places them in front of the furnaces. This cradle is a temporary arrangement, as it is being replaced with three piler cradles and three cars on which the cradles will be pushed when loaded so that there will be no interruption of the shear. A sheet bar pickling tank will also be installed in the storage building.

Instead of having combination furnaces, the plant has separate sheet and pair furnaces. There are four double continuous pair furnaces and eight sheet furnaces. The furnaces are placed in a staggered position, the sheet furnaces being close to the mill trains and the pair furnaces set several feet back, between the sheet furnaces and close to the bar yard. The furnaces are of a standard type supplied by the Geo. J. Hagan Co., Pittsburgh. The pair furnaces are charged with electrically operated pushers supplied by the Hagan company.

The hot mills consist of eight finishing and eight roughing stands, eight stands in each duplicate train,

ringbone gear with a reduction of approximately 8 to 1. Connected to the reduction gear shaft are two 29,000-lb. flywheels.

An interesting feature of the motor installation is the adoption of two types of motor control. One motor has the Westinghouse notch back system of control, and the other, the Allis-Chalmers liquid-slip regulator. This gives an opportunity for comparing the two types of control under exactly similar operating conditions. In this connection, it might be mentioned that in the old plant the company is using the General Electric notch back relay control, so that it has the three types of motor control at its Riverside Works. The controls are inclosed in separate brick houses located between the sheet furnaces, where they are protected from dirt and rattle. The electric current is supplied from the power house at the old plant, being carried to the new plant in underground conduits. The steam for the picklers and doublers and the compressed air supply also come from this power house.

To provide for the comfort of the men, water cooled standings of the Baird type are located beneath the



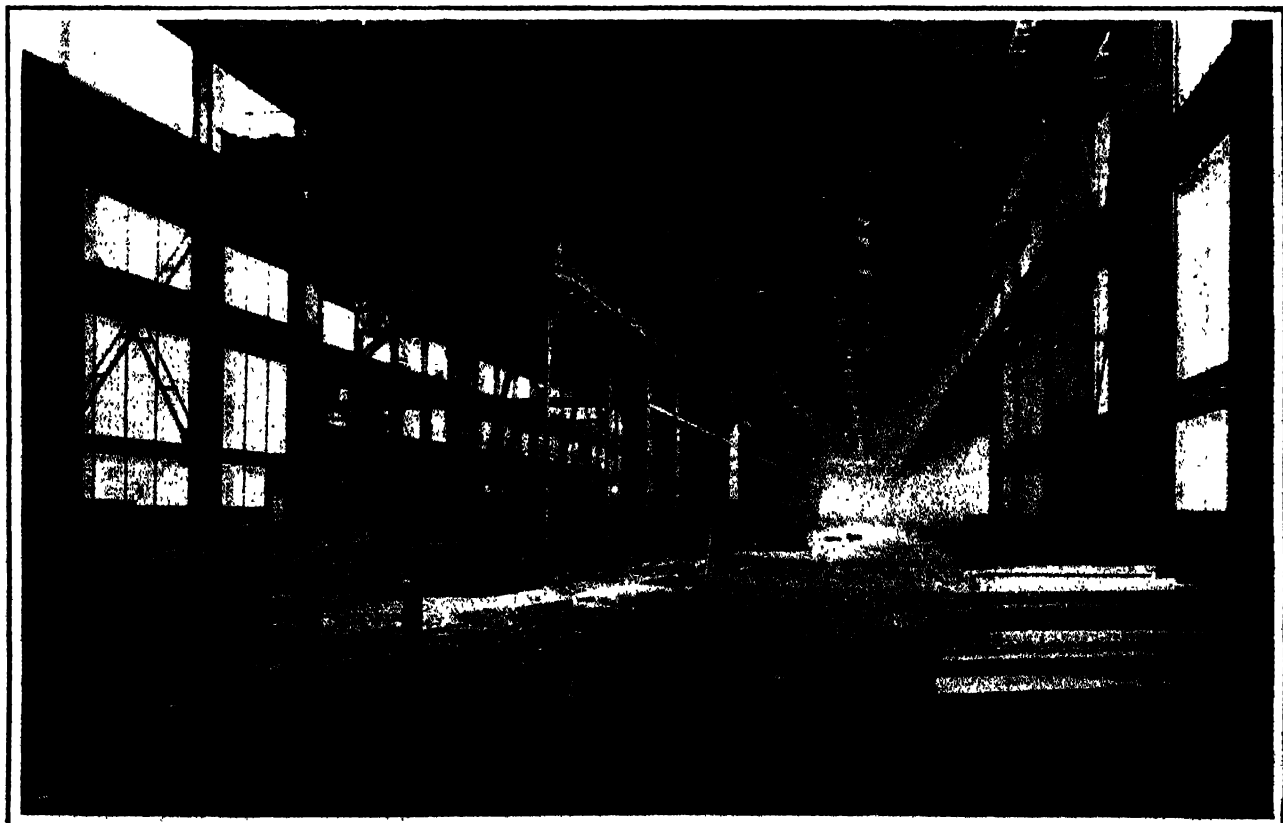
The Furnaces Are Located in a Leanto Adjoining the Mill Building. This picture shows the staggered position of the furnaces, the double pair furnace at the right being several feet further back than the sheet furnaces. The two roughing mill stands at the left adjoining one of the drives, not shown, have electrically operated screw-downs. This picture shows some of the steam operated doublers

floor between the furnaces and hot mill stands. Between the mills and furnaces are steam operated doublers, one for each pair of mills. These were supplied by the United Engineering & Foundry Co., Pittsburgh.

Four 150-in. squaring shears, one for two mills, are located back of the finishing mills on the opposite side of the mill building. Sheets pass from the back of the shears into the adjoining shear building. With the shears in the mill building, the entire 40-ft. bay of the

shear building is left free for the handling of stock. The shears are driven by 15-hp. motors. They were supplied by the Erie Foundry Co., Erie, Pa. The mill building is served by a 40-ton crane and the shear building by a 10-ton crane.

Scrap is bundled in a hydraulic baler supplied by the Galland-Henning Mfg. Co., Milwaukee, located at the lower end of the shear building. The bundles of compressed scrap are handled with the overhead crane. A drag type of conveyor will be installed for carrying



View from the End of Cold Rolling and Annealing Department Looking into the Shear Building at the Right and the Mill Building at the Left. The squaring shears are located along the columns in the mill building. A wide shear building permits the storage of sheets in this bay until needed in the annealing and cold rolling department. The shear department crane runway extends into the annealing department under the crane in that department, for convenience in handling stock



The Inclosed Shipping Platform of the Warehouse Is Shown at the Left

the bales of scrap from the baler to railroad cars outside of the building. Sheets pass down the shear department in one direction and the scrap goes in the opposite direction. This routing arrangement is found to be very convenient.

A 15-ton Fairbanks scale is located in the shear building and a 10-ton scale in the bar storage building. All bars are weighed after shearing and before being charged into the pair furnaces and the sheets are weighed after leaving the squaring shears. This gives a check on the amount of scrap.

The annealing and cold rolling building, as previously mentioned, connects to the shear and mill buildings and is practically a continuation of the latter buildings. This department is served by a 40-ton crane for handling annealing boxes and a 10-ton crane for handling sheets. The crane runway of the shear building extends 40 ft. into the annealing department, providing an overlapping of crane runways, the runway in the annealing department being 15 ft. higher than that in the shearing department. With this crane arrangement, trucking is avoided and hand labor is reduced to a minimum in delivering sheets from the shear department to the annealing department.

There are five stands of cold rolls in one train set at right angles to the length of the building. These have 28-in. rolls. Two of the cold rolls and their drive were supplied by the Fawcus Machine Co., Pittsburgh, and the others were made by the Otis company. They are driven by a 200-hp. motor.

There are six double annealing Hagan furnaces of single box length located in the leanto adjoining the annealing floor. Annealing furnace temperatures are taken with Brown pyrometers, temperature recording charts being located in the mill office. There are also temperature indicators at all the furnaces. The pyrometers are expected to prove particularly useful in connection with the annealing furnaces when special heats are required.

The annealing boxes are in two sizes, 160 in. long, 46 in. wide and 48 in. high and 182 x 42 x 66 in. The common method of rolling the boxes into the furnaces on cast iron balls is followed.

The pickling department, located in a building at the side of the annealing department, is equipped with two Mesta four-arm steam operated automatic pickling machines. A special coke fired drying machine designed and built by the Otis company is provided for drying high finished sheets after pickling. These sheets pass between rubber rolls on to a motor operated conveyor that carries them through the drying chamber

about 18 ft. in length. The conveyor is operated by a variable speed motor. This machine is brick inclosed. At present only one 54-in. galvanizing pot has been installed.

The warehouse and shipping department is a hot water heated brick building with wood block floor. This is conveniently located, sheets being taken into the warehouse through two doors that connect with the adjoining cold rolling and annealing department. Sheets are hauled to the warehouse on roller bearing trucks built by the Ohio Galvanizing & Equipment Co. and by Lakewood Engineering tractors as well as with hand trucks. The warehouse is served by a 10-ton crane. The shipping platform is located in a leanto 16 ft. 6 in. wide that extends the length of the warehouse on the side opposite the annealing department. A depressed railroad track extends the length of the platform and all loading is done under cover. Sheets in the warehouse are kept on trucks as far as possible in order to obviate the labor of re-handling as well as to avoid the scratching of finished sheets in re-handling.

The warehouse equipment includes two Erie Foundry Co. 156-in. squaring and other shears, two Walker & Elliot and a Hillis & Jones roller leveler, an oiling machine made by the Otis company, a Streine corrugating machine, a Globe Foundry & Machine Co. patent leveling and stretching machine, a painting machine, a Standard and a Fairbanks bundling scale and a Fairbanks beam registering shipping scale.

The powdered coal plant occupying a building conveniently located in respect to the heating and annealing furnaces was installed by the Quigley Furnace Specialties Co., now the Hardinge Mill Co., New York. Coal is dumped from cars into a track hopper and is crushed by a 18 x 18-in. Jeffery single roll crusher. Then it is elevated to a 55-ton bin, from which it is discharged into a Ruggles-Cole dryer. From the dryer it is again elevated to a storage bin over a Raymond five-roller impact pulverizer, which delivers it to a 3-ton blow tank on the floor of the building. This tank is located on the platform of a hollow dial scale. The scale shows when the amount of fuel required has been delivered to any service bin.

The sheet and pair furnaces are served by four 3-ton steel bins, one bin for four furnaces, and the annealing furnaces by three 7-ton bins, one for two furnaces. The bins are located in the rear of the furnaces, being set back at a sufficient distance to avoid danger of the fuel catching on fire in the bins. The powdered coal is carried from the blow tank to the service bins in a 4-in. overhead conduit under air pressure supplied

by an Ingersoll-Rand motor-driven air compressor with a capacity of 265 cu. ft. per minute. From the bottom of the bins the fuel passes through a screw feeder and drops into a siphon, from which it is delivered to the furnace burners by means of a primary air system, one fan serving the sheet and pair furnaces and another the annealing furnaces.

The supply lines from the bins to the furnaces are 2½ in. in diameter for the shorter lines and 3 in. in diameter where longer lines are required. At the furnaces the fuel is mixed with air from a secondary air system that supplies air for combustion purposes. Four fans are provided for supplying air for the primary and secondary systems, one for each system in connection with the sheet and pair furnaces and the other two supplying similar service for the annealing furnace air systems. The primary system fan for the sheet and pair furnaces is driven by a 7½-hp. motor and the primary system fan for the annealing furnaces is driven by a 10-hp. motor. Both the fans for the secondary system are driven by 25-hp. motors. The fans were supplied by the Clarage Fan Co. A cyclone dust collector is located above each supply bin, these being above the roof of the sheet and pair furnace leanto and beneath the roof in the annealing furnace room.

All construction work on the plant outside of the erection of the buildings and furnaces, including even the wiring and piping, was done by the Otis company. The buildings were designed by the company and erected by the American Bridge Co. With the exception of a brick wall extending 6 ft. from the ground, the sidewalls of the mill buildings are of corrugated steel and continuous factory ribbed glass windows in Lupton and Fedastra steel sash with continuous ventilating sections. The roof is of corrugated steel. The warehouse roof is of 1¼-in. sheathing covered with four-ply asbestos roofing. The building and mill foundations are set on Raymond concrete piles. All the crane equipment was supplied by the Cleveland Crane

& Engineering Co. with the exception of one of the 40-ton cranes, which was built by the Alliance Machine Co. The electric motors outside of the two mill motors were furnished by the General Electric Co.

Gear guards, safety ladders and other safety devices are provided for the safety of the men. Shower baths, lavatories, lockers and other conveniences for the men will be provided in a separate building that is to be erected.

Canada's Pig Iron and Steel Output in 1921

The pig iron and steel output of Canada in 1921 was as follows, according to data issued by the Dominion Bureau of Statistics:

Pig Iron:		Gross Tons
Basic	.....	461,578
Foundry	.....	97,304
Malleable	.....	35,084
Castings	.....	388
Total	.....	594,354
Ferroalloys	.....	22,493
Steel Ingots and Castings		
Open-hearth, basic	641,882	6,531
Open-hearth, acid	239	256
Bessemer	94	1,628
Electric	2,860	13,984
Total	645,075	22,409

The 1920 production of pig iron was 974,000 tons, and that of steel ingots and castings 1,109,000 tons.

Of the 1921 pig iron output 610 tons was made in electric furnaces, and out of a total of 20 furnaces, 18 were idle at the end of December.

The absorption of the Haskell & Barker Car Co. by the Pullman Co., Chicago, has been effected and Edward F. Carry, president of the former Haskell & Barker Car Co., has been elected president of the Pullman Co. The new Pullman organization also includes as directors D. A. Crawford and C. A. Liddle, respectively treasurer and vice-president of the Haskell & Barker Car Co.

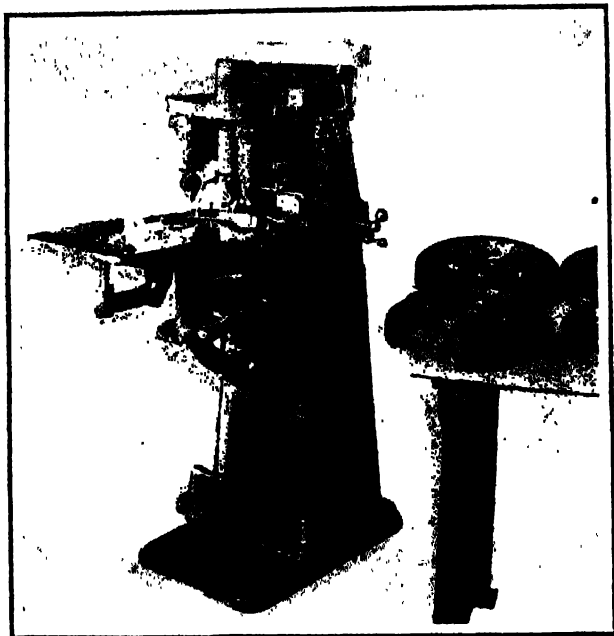


The Annealing Furnaces Are Located in a Leanto Building Adjoining the Annealing Department. The picture shows the fuel storage bins, dust collectors and the primary and secondary air supply lines

Multiple Tapping Machine with Dial Feed

A multiple-spindle tapping machine equipped with dial feed and eliminating the use of clutches for reversing the rotation of the spindles has been brought out by the Anderson Die Machine Co., Bridgeport. It is intended for large quantity production of small brass and steel pieces, such as enter into the construction of electrical appliances. It can be used also to advantage, it is said, in tapping nuts and other small pieces.

This machine is intended to overcome the limitations of designs using some form of clutch for reversing the direction of spindle rotation, which designs usually have but a single spindle and employ a geared head in cases where more than one hole is to be tapped. It is



The Spindles Are Driven in Alternate Directions by Means of a Gear-Tooth Segment and Train of Gears

also intended to provide greater production capacity than afforded by machines having dial feed which necessitate rotating the dial by hand and leaving one hand free for inserting the work. The production of the latter type, it is pointed out, is limited to the speed of the operator in rotating and advancing, as well as feeding, and the fact that the clutches must be reversed by hand or foot.

The machine is shown in the accompanying illustration and is similar in operation to the dial-fed punch press. The spindles are driven in alternate directions by means of a gear-tooth segment and train of gears, the segment being controlled by a crank disk at the upper end of the vertical shaft extending through the central part of the main frame. Cams for indexing the dial and locking it in its proper position are secured to the vertical shaft. A ratchet arrangement controls the dial and has regularly 18 teeth, leaving 18 openings in the dial. The dial is of relatively thin material and has openings to fit the particular pieces to be operated upon. Pieces with one, two or three holes can be tapped at one passing, and the construction of the chuck spindles permits of three taps of entirely different leads being used simultaneously.

The tap spindles on each side of the fixed central spindle are adjustable to take care of any combination or location of the three holes. The dials are made to suit the primary or central spindle, which is not adjustable. The dial is then located or rotated to bring the one hole in register with the fixed spindle; then the two auxiliary spindles are adjusted to suit the location of either of the other two holes.

As to production, the machine for the general tap sizes used in electrical work (Nos. 4 to 10), the tap is run at a speed of 56 strokes per min., which is readily fed into the dial. This would give, it is claimed, an hourly production of 3300 pieces with either 1, 2 or 3 holes. On pieces where only 1 hole is tapped, it is said

to be possible to double up the output by doubling the number of slots in the dial, and so adjust one of the auxiliary spindles as to tap the staggered opening in the dial. This, it is claimed, would result in about 112 pieces per min. on single-hole tapping.

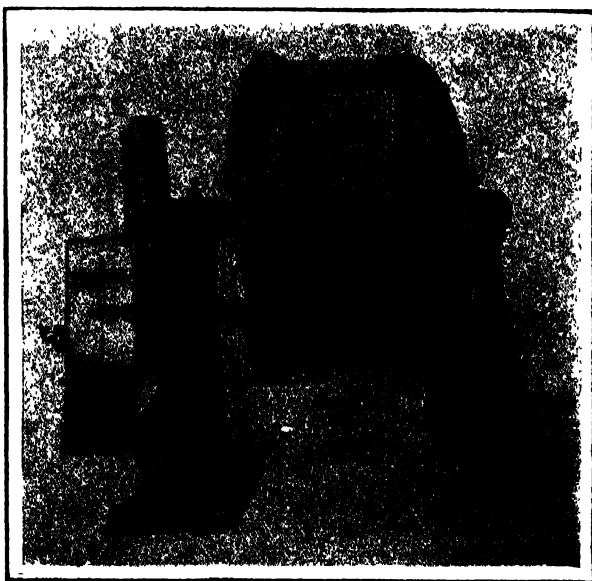
A cam and slide which will work in conjunction with the dial to enable round pieces to be tapped without difficulty can be supplied. It is understood, of course, that with the particular form of drive employed in this machine it is possible to time the various movements accurately and without danger of the time being upset for any reason. Spindles running at relatively high speed are mounted in ball bearings.

Work-Holding Burnishing Barrel

A burnishing barrel in which the work is held stationary to the inside of the barrel body and is carried by it through a mixture of balls, soap and water has been developed recently by the Abbott Ball Co., Hartford. The object of this design is to permit work to be finished without the danger of one piece coming in contact with another and bruising or scratching it.

The barrel body is eight-sided, each side having a hinged hand-hole cover. The opening into the barrel body is beveled to provide a tight fit for an inside cover plate which sets into this opening, and is held in place by the hinged cover coming against two flat springs mounted on the back of the inside plate. The springs are used as handles when the plate is lifted out. The hinged cover has packing around it so that when it is clamped the openings are watertight.

The work is held by fixtures which are fastened to the face of the cover plate. As the machines are primarily for finishing large quantities of one or more classes of work, two or three sets of cover plates and work-holding fixtures are used to advantage. Thus



The Work Is Mounted on a Fixture and Held Stationary

while unloading and loading one set of fixtures the machine would be operating on a set in the barrel. When the work is finished, instead of dumping the balls from the barrel, it is merely necessary to open the top cover, lift out the fixture, replace it with another, close the hinged cover, bring the next hole up to the top and repeat the operation until all of the finished work is out of the barrel and the new batch in.

On work to be plated three sets of fixtures can be used. In this case, when the work comes out of the barrel it is left on the fixtures, put through the plating operation and brought back to the burnishing barrel for its final finishing. This is done with one loading of the fixture.

The barrel may be cleaned without removing the balls by means of a special strainer cover placed over one of the openings. The barrel is opened, filled with water and the machine operated until the rinsing is complete.

Motor Driven Horning Press

A special horning press, equipped with direct motor drive and guarded wheel, as shown, has been brought out by the Ferracute Machine Co., Bridgeton, N. J.

The motor rests on a shelf that is bolted to a tablet cast in the frame and a rawhide pinion on the motor meshes with teeth cut in the flywheel. The direct drive thus effected dispenses with belt connection and economizes space. The wheel is not only entirely surrounded with a guard, but has also a wire mesh cast between the flywheel spokes, a feature intended to provide a thorough safeguard against accidents when the wheel is in motion.

The horn hole in the frame is 7½ in. in diameter and 43 in. from the floor, a rather unusual height for



Horning Press Equipped with Direct Motor Drive and Special Flywheel Safeguard

special work. The horizontal distance from center of the ram to the planed front of the frame is 11 in. The guides in the vertical front are planed to enable an adjustable bed to be affixed at various heights, square with the bottom of ram, the connections being made by means of large bolts and dowels. Parallelism between the bed and ram surfaces is thereby assured.

The wide variation in the distance between the bed and the ram, together with the facilities for horning and the unusual height of the press, are intended to provide for a greater latitude of work than is customary. The press shown is the fourth in a series of five sizes.

Crucibles from Domestic Clays and Graphites

Early in 1918 the Columbus (Ohio) station of the Bureau of Mines began an investigation of American bond clays and graphites to determine their crucible-making properties in comparison with foreign clays and graphites. Work on the bond clays, which was completed in the fiscal year 1920, showed that better crucibles could be made from domestic clay than from imported clays. The testing of graphites on which some preliminary work had been done was then undertaken by the Bureau of Mines. Samples of seven graphites, from Ceylon, Madagascar, Canada, New York, Alaska, Texas, and Montana, of 400 pounds each were obtained. Ten crucibles of No. 70 size were made from each graphite for brass melting purposes, and six crucibles of No. 60 size for testing under steel melting practice. These crucibles were made in the plant of the Vesuvius Crucible Co., Swissvale, Pa. The brass melting crucibles were shipped to the plant of the Detroit Lubricator Co., Detroit, where they were tested under regular brass melting practice.

Arrangements were made for testing the steel melting crucibles in the plant of the Simonds Mfg. Co.,

Lockport, N. Y., but when the crucibles were ready for shipment word was received that the pit furnaces of the Simonds steel plant were not in operation, and as they have not been in operation since that time, it has been impossible to test the steel melting crucibles.

In the brass melting tests, the average number of heats of the crucibles shown by the different graphites are as follows: Alabama, 13.09; Madagascar, 12.44; Ceylon, 10.50; New York, 9.60; Texas, 6.80; Montana, 6.11; Canadian, 5.80. These results indicate that good brass-melting crucibles can be made from Alabama graphite, and agree with the findings of previous work.

Automatic Stoker Companies Merged

A merger has been effected of the Combustion Engineering Corporation of New York, the Underfeed Stoker Co., London, England, Lupulco Systems, Inc., International Pulverized Fuel Corporation and the Combustion Engineering Building, Inc. The new company has been incorporated as the International Combustion Engineering Corporation. One third of the capital stock of the Societe Anonyme des Foyers Automatiques of France has been acquired. Automatic stokers and accessories are the principal articles manufactured by the companies entering the consolidation. Officers of the new company are George E. Learnard, president; W. R. Wood, J. Scott Skelly, Joseph V. Santry, Charles J. Peabody, vice-president; George H. Hansel, secretary and treasurer, and Benjamin Harrison, assistant secretary.

Growth in Chicago Industries, 1914-19

According to census figures given out at Washington, the number of factories in Chicago increased only 4.2 per cent between 1914 and 1919, but the capital, wages and value of output were more than doubled:

	1919	1914
Number of establishments	10,538	10,115
Persons engaged in manufacturing	502,303	387,319
Proprietors and firm members	8,182	8,184
Salaried employees	90,064	66,425
Wage-earners, average number	404,057	313,710
Primary horsepower	826,420	681,114
Capital	\$2,076,194,000	\$1,190,069,000
Salaries	188,448,000	90,295,000
Wages	508,276,000	218,737,000
Materials	2,380,025,000	901,833,000
*Value added by manufacturers	1,278,715,000	581,565,000

*Value of products less cost of materials.

Helical-Flute Expansion Hand Reamer

A helical-flute expansion hand reamer in sizes up to 2½ in. in diameter has been placed on the market by the Millersburg Reamer & Tool Co., Inc., Millersburg, Pa.

The helical flutes permit the production of clean-cut



Helical-Flute Expansion Hand Reamer

holes, accurate as to size, which is due to the smooth, shearing action of blades of this design. The blades may be expanded to compensate for wear and re-sharpening, thus maintaining the original size of the tool. It is claimed that this tool gives 30 to 40 per cent more production than a similar tool of the straight-fluted type.

The Department of Commerce announces that moving pictures are to be used extensively to promote foreign trade. Some remarkable industrial pictures have been taken by the United States Bureau of Mines and other agencies, particularly of the manufacture of certain steel products and of mining operations. Some that have been exhibited at technical conventions have been good substitutes for plant visitation. The plan contemplates that the cost of the films be borne by the company whose product is shown.

Automatic Machine for Production Drilling and Reaming

A special machine for drilling, reaming, facing, countersinking and other operations on comparatively small pieces produced in quantity, has been brought out by H. Edsall Barr, Erie, Pa. Rapid production and simplicity of construction are the features emphasized by the maker.

From the accompanying illustration it may be seen that there are two spindles on the face of the column, each spindle rotating in a square guide block. The two spindles rotate in a right hand direction and are driven by noiseless gears at the upper end which mesh into a central drive gear. At the rear of the machine there is a cam shaft, operating at 20 r.p.m., which carries three duplicate sets of cams, one set each side of the center line. Each large middle cam operates a lever arm through a steel roller which is kept against the cam by a heavy coil spring. The lever arm is fulcrumed on the column and its end toward the spindle is cut as a gear segment; this meshing with a rack on the rear side of the square spindle guide block.

Thus the rise of the middle cams move the respective spindle automatically downward, while the spindles are rotated by the upper shaft driving a short middle shaft through the bevel gears shown. The cams for each side of the machine are set so that the spindles, etc., operate alternately. The middle cams have a uniform rise, giving a steady feed to the spindle; and a quick drop, giving rapid return of the spindle after completion of the cutting stroke. The cams may be changed to give less than maximum spindle travel, as in drilling or reaming thinner material. The cams may also be replaced by others of different contour to allow a dwell at the end of the feed stroke as in facing or countersinking.

The cam shaft is driven from the cone pulley through gearing which provides the proper reduction of speed and by the use of the cone pulley various rates of spindle feed are obtainable. The lower ends of the spindles are regularly equipped to hold a high-speed tool by a set screw, inasmuch as the machine is intended for continuous or at least extensive runs on the same piece and quick or frequent change of the tool is not required. However, the spindle can be provided with a taper socket if required.

A rotatable fixture head having inserted steel pockets to receive the work to be machined is located beneath the spindles, as shown. There are four pockets in each head, and the head rotates $\frac{1}{4}$ turn after each rise of the respective spindle. The head is rotated by an internal cam on the rear shaft, which pulls the side rod toward the rear, the side rod rotating the head by a lever loosely mounted on the head spindle and provided with a steel dog which engages slots in the fixed collar of the head spindle. The backward or reverse movement of the side rod is then without effect on the fixture head, this motion simply placing the dog in position to rotate the head another quarter of a turn at the proper time. Outside cams on the rear shaft operate a side arm which in turn moves a tapered pin into engagement with holes in a fixed collar on the head spindle. This occurs after the head has been rotated to a new quarter and is designed to lock the head in

accurate position as to alignment with the spindle holding the tool.

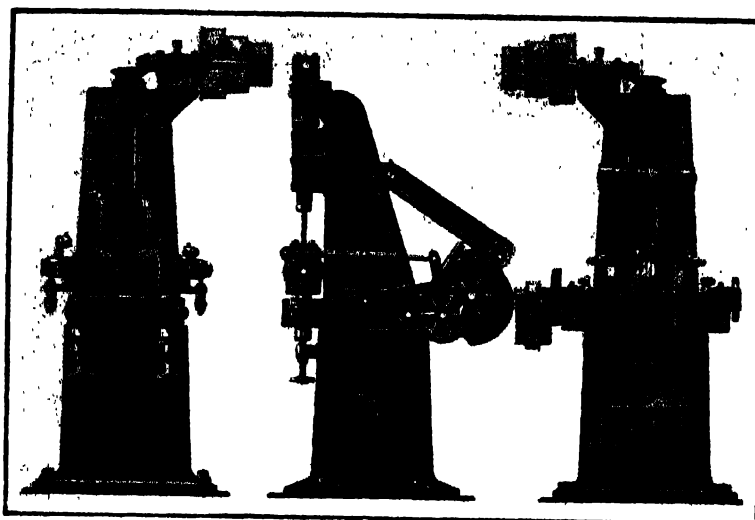
The operator sits facing the spindles and from a sheet-metal container fastened across the machine he picks the pieces to be worked on, placing them in the pocket facing him, first in the left hand and then in the right hand head. All the motions of the machine continue without attention from the operator and the finished pieces fall into chutes and from thence into metal tote boxes, located at the rear and off the floor, as shown.

The cone pulley driving the spindle allows variation of rotative tool speed independently of the feed. The fixture heads are movable up or down by the hand wheels beneath the turned column of the fixture head.

The machine is designed to take drills or reamers up to $\frac{1}{2}$ in. As an indication of the capacity, pieces of

gray iron $\frac{3}{8}$ in. thick, having a $\frac{1}{8}$ -in. cored hole, not previously drilled, are reamed at the rate of 40 pieces per min. The machine may be used with both spindles on one operation or, as in the case of drilling and reaming the same piece, and where the quantity of work does not require two machines, the drilling may be done on the left spindle and the reaming on the right spindle of the same machine. In working on steel parts of some thickness, requiring

greater time between head rotations, one operator can feed two machines. Suitable safeguards are provided for gears and other moving parts.



Front, Side and Rear View of Automatic Machine for Drilling, Reaming and Other Operations on Small Pieces. It is intended for quantity production and for continuous runs on same piece

Coal and Coke in 1921

Bituminous coal produced from April 1 to Dec. 31, 1921, according to the United States Geological Survey, amounted to 306,552,000 net tons, an average of 1,331,000 tons per day, compared with 419,996,000 tons in the same period of 1920, an average of 1,821,000 tons per day. For the calendar year 1921, production was 408,065,000 net tons, compared with 556,563,000 tons in 1920, with 458,063,000 tons in 1919, and 579,386,000 tons in 1918. The average, from 1913 to 1920 inclusive, was 499,011,000 tons. Production up to Jan. 14 (the coal year begins April 1) of the past five years shows this year to be one of great depression, thus:

Years of Activity	Years of Depression
1917-18..... 434,686,000	1919-20..... 375,517,000
1918-19..... 465,110,000	1921-22..... 322,270,000
1920-21..... 440,695,000	

By-product coke, in December, reached a figure about equivalent to the average of 1917, but beehive coke showed less than 20 per cent of the 1917 average.

Output of By-Product and Beehive Coke in the United States (Net Tons)

	By-product Coke	Beehive Coke	Total	Total Coal Consumed
1917 monthly average	1,870,000	2,764,000	4,634,000	6,979,000
1918 monthly average	2,166,000	2,540,000	4,706,000	7,086,000
1919 monthly average	2,095,000	1,587,000	3,682,000	5,466,000
1920 monthly average	2,569,000	1,709,000	4,278,000	6,349,000
September, 1921.....	1,423,000	289,000	1,712,000	2,500,000
October, 1921.....	1,734,000	416,000	2,150,000	3,147,000
November, 1921.....	1,768,000	477,000	2,245,000	3,290,000
December, 1921.....	1,860,000	514,000	2,374,000	3,483,000

A blow-out in the bottom of the furnace of the Detroit Iron & Steel Co., Detroit, Jan. 14, caused the death of two men and the injury of a third. The operation of the furnace was resumed in about 48 hours.

Cold Rolled Strip Steel Calculations

Formulas for Determining Pounds Output and Piece-Work Rates in the Manufacture of Cold Rolled Strip Steel

BY S. T. HILLIARD

FOR determining quickly and accurately the output of rolling mills and of apparatus having a constant speed take-up in the manufacture of cold rolled strip steel, and to figure piece-work rates per 100-lb. to be applied to the work, the following formulas have been computed. Time study is eliminated, except for that required to find the amount of time during which the machine is idle, or the time lost between passes. As all other factors are known, output and rates can be solved by a mathematical equation. Long observation and rough approximation are thus eliminated.

The weight of steel is taken as 490 lb. per cu. ft. In case of high carbon steel, 489 lb. per cu. ft. would need to be used. A slide rule should be employed in the computation. The legend is as follows:

A—base rate in dollars
R—number of take-ups, or mills
C—number coils rolled
D—total weight rolled
E—per cent efficiency
F—ft. per hr. of stock
L—weight of coil in lb.
M—minutes between passes
N—number of passes
P—lb. per hr. at 100 per cent efficiency
R—radius of take-ups in inches
R_o—outside radius of coil
S—r.p.m. of take-up
T—thickness in inches
W—width of stock in inches

The output of a mill in lb. per hr., at 100 per cent efficiency, can be determined by the following:

$$P = \frac{WTF}{144} \times 490 = \frac{WTF}{0.294} = 3.4 \times WTF$$

The length in feet of a coil of weight L is:

$$\text{Feet} = \frac{0.294 L}{WT}$$

An equivalent thickness for any number of passes can be found by the following:

$$T = \frac{\text{1st pass}}{1 + \frac{\text{1st pass}}{\text{2nd pass}} + \frac{\text{1st pass}}{\text{3rd pass}} \text{ etc.}}$$

In the denominator, 1st pass, 2nd pass, etc., are taken as whole numbers. Thus, if four passes are 0.010—0.008—0.006—0.004 in.,

$$T = \frac{0.010}{1 + \frac{10}{8} + \frac{10}{6} + \frac{10}{4}} = 0.00156 \text{ in.}$$

Problem: $F = 6000$ ft. $W = 1\frac{1}{2}$ in. Passes, the same as above. Required, the output per hour at 100 per cent efficiency.

$$P = \frac{WTF}{0.294} = \frac{1\frac{1}{2} \times 0.00156 \times 6000}{0.294} = 47.7 \text{ lb.}$$

The following, and perhaps more simple, method of getting the same result, calls for the use of a table. The first method can be readily remembered.

Thick- ness, In.	Running Ft. per Lb. 1 In. Wide	Thick- ness, In.	Running Ft. per Lb. 1 In. Wide	Thick- ness, In.	Running Ft. per Lb. 1 In. Wide
0.004	73.5	0.020	14.7	0.036	8.17
0.005	58.8	0.021	14.0	0.037	7.95
0.006	49.0	0.022	13.4	0.038	7.74
0.007	42.0	0.023	12.8	0.039	7.54
0.008	36.75	0.024	12.25	0.040	7.37
0.009	32.7	0.025	11.75	0.041	7.20
0.010	29.4	0.026	11.3	0.042	7.0
0.011	26.7	0.027	10.9	0.043	6.85
0.012	24.5	0.028	10.5	0.044	6.68
0.013	22.6	0.029	10.1	0.045	6.53
0.014	21.0	0.030	9.8	0.046	6.4
0.015	19.6	0.031	9.5	0.047	6.26
0.016	18.4	0.032	9.2	0.048	6.13
0.017	17.3	0.033	8.9	0.049	6.0
0.018	16.3	0.034	8.65	0.050	5.88
0.019	15.5	0.035	8.4		

Formula for ft. per lb. of stock 1 in. wide = $\frac{0.294}{T}$

Thus, flat wire = 0.018 in. thick,

$$\frac{0.294}{0.018} = 16.33 \text{ ft. per lb.}$$

Method of Use

Divide the ft. per hr. of the mills by the sum of the ft. per lb. of the passes, and multiply by the width in inches. The result is the lb. per hr. output of the mill or mills at 100 per cent efficiency.

Illustration: Use the same problem as above.

$$29.4 \div 36.75 + 49 + 73.5 = 188.65$$

$$\frac{6000}{188.65} \times 1\frac{1}{2} = 47.7 \text{ lb. per hr., as before.}$$

To find the per cent efficiency, E , when the time lost between passes is known, use the following formula:

$$E = \frac{60}{\frac{N \times P \times M \times C}{D \times B} + 60}$$

$$\text{Rate per 100 lb. in dollars} = \frac{A}{\frac{E \times P}{100}} = \frac{100 A}{E \times P}$$

$$= \frac{100 A}{60 P} \div \frac{5 A \left(\frac{NMPC}{DB} + 60 \right)}{3 P}$$

$$\text{But } P = \frac{WTF}{0.294}$$

$$\text{Therefore Rate} = A \left(\frac{5 NMC}{3 DB} + \frac{29.4}{WTF} \right)$$

The formula in this form would be used to determine the rate after the work is done, as it contains the factors $\frac{C}{D}$ which give the exact average weight of coils.

This would probably entail too much clerical work, so that a weight of coil would be assumed as in the case of a table of rates. Then L is substituted for $\frac{D}{C}$ and $N=1$, whence

$$\text{Rate} = A \left(\frac{5 M}{3 LB} + \frac{29.4}{WTF} \right)$$

Illustration: Assume $M = 2$ min., $L = 70$ lb., $B = 2$ mills, $F = 12,000$ ft. (2 mills), $W = 1\frac{1}{2}$ in., $T = 0.020$ in., Base Rate = \$0.60 per hr.

$$\text{Rate} = \$0.60 \left(\frac{5 \times 2}{3 \times 70 \times 2} + \frac{29.4}{1\frac{1}{2} \times 0.020 \times 12,000} \right) = \$0.0633 \text{ per 100 lb.}$$

It is seen that all but W and T become constants, so that the amount of computation is really small. A table of rates can thus be quickly and accurately made up.

Formulae for lb. per hour of a constant-speed take-up and rate per 100 lb. for it:

R_o = outside radius of coil in inches

S = r.p.m. of take up

$$\text{mean circumference of coil in feet} = \frac{\pi (R_o + R)}{12}$$

$$= 0.262 (R_o + R)$$

$$F = B \times S \times 0.262 (R_o + R) 60 = 15.7 B S (R_o + R)$$

$$\text{Cu. ins. in coil} = \frac{L}{490} \times 1728 = 3.527 L$$

Also cu. ins. in coil = $\pi W (R_1^2 - R^2)$
 $\therefore 3.527 L = \pi W (R_1^2 - R^2)$

Solve for R_1 :

$$R_1 = \sqrt{\frac{1.123 L}{W} + R^2}$$

$$\text{Then } F = 15.7 BS \left(\sqrt{\frac{1.123 L}{W} + R^2} + R \right)$$

$$\text{But rate} = A \left(\frac{5M}{3LB} + \frac{29.4}{WTF} \right) \quad (\text{Substitute for } F)$$

$$= A \left[\frac{5M}{3LB} + \frac{29.4}{15.7 W T B S \left(\sqrt{\frac{1.123 L}{W} + R^2} + R \right)} \right]$$

$$= \frac{A}{B} \left[\frac{5M}{3L} + \frac{1.87}{W T S \left(\sqrt{\frac{1.123 L}{W} + R^2} + R \right)} \right]$$

In a specific case, factors A, B, M, L, S and R are constant, so that the only variables are T and W . Thus $A = \$0.60, B = 2, M = 2 \text{ min.}, L = 70 \text{ lb.}, W = 1\frac{1}{2} \text{ in.}, T = 0.010 \text{ in.}, S = 50 \text{ r.p.m.}, R = 6 \text{ in.}$

$$\text{Piece-work rate per 100 lb.} = \frac{0.60}{2} \left[\frac{5 \times 2}{3 \times 70} + \frac{1.87}{1\frac{1}{2} \times 50 \left(\sqrt{\frac{1.123 \times 70}{1\frac{1}{2}} + 36} + 6 \right)} \right]$$

$$1\frac{1}{2} \times 0.010 \times 50 \left(\sqrt{\frac{1.123 \times 70}{1\frac{1}{2}} + 36} + 6 \right) = \$0.06286$$

In making a table of rates for these mills, for coils of 70 lb., T and W would be left in the formula. It would then be written:

$$\text{Rate per 100 lb.} = 0.014286 + \frac{0.01122}{TW \left(\sqrt{\frac{78.61}{W} + 36} + 6 \right)}$$

Any width can now be substituted and a rate for any thickness, of that width, is found by one division and one addition.

The formula would read, when $W = 1\frac{1}{2} \text{ in.}$

$$\text{Rate per 100 lb.} = 0.014286 + \frac{0.000486}{T}$$

Pounds per hour for a constant-speed take up is found by

$$P = 53.4 WTBS \left(\sqrt{\frac{1.123 L}{W} + R^2} + R \right)$$

The outside radius of a coil is:

$$R_1 = \sqrt{\frac{1.123 L}{W} + R^2}$$

The inside radius of a coil is:

$$R = \sqrt{R_1^2 - \frac{1.123 L}{W}}$$

If E per cent efficiency is assumed, the piece-work rate per 100 lb. contains the factor:

For a constant-speed take up =

$$\frac{1.87 A}{E \times WTBS \left(\sqrt{\frac{1.123 L}{W} + R^2} + R \right)}$$

For wire moving at a fixed speed =

$$\frac{29.4 A}{E \times WTF}$$

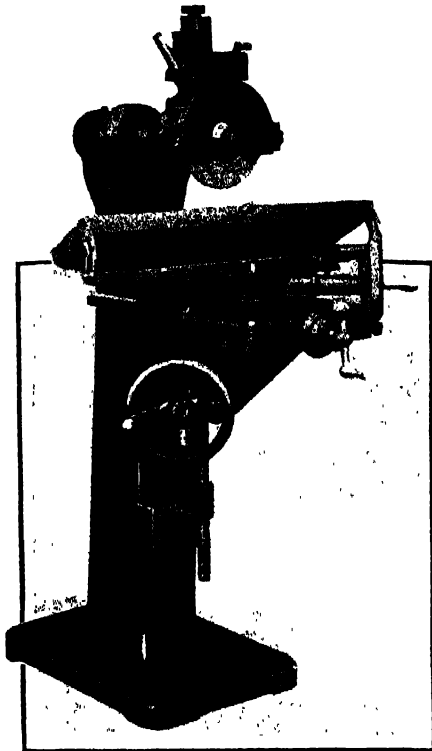
A self-supporting stack to take care of the hot blast stoves has been built for the blast furnace at Girard, Ohio, of the A. M. Byers Co., Pittsburgh. At the bottom the stack is 14 ft. in inside diameter, tapering in 45 ft. to 8 ft. $\frac{3}{4}$ in. in diameter and continuing at this diameter for 180 ft. for a total height of 225 ft. It is provided with a coping ring on top for keeping the moisture off the brick lining, also with a ladder and safety cage of such construction that the workman climbs between the ladder and the stack. In other words, there is a bar frame work extending from the ladder to the stack, creating a cage; ordinarily, there is a space between the ladder and the stack, and the safety cage is on the outside of the ladder.

The 16 foundation bolts are 3 in. in diameter, and they extend through a U shaped bracket forged from one solid piece of $\frac{3}{4}$ -in. plate. These brackets are 4 ft. high. The stack was built by the Sharpville Boiler Works Co., Sharpville, Pa.

Surface Grinder Equipped with Tilting Table

In addition to plain and swivel table styles, the Wilmarth & Morman Co., Grand Rapids, Mich., is placing on the market its No. 1 hand-feed surface grinder equipped with a tilting table, as shown in the accompanying illustration.

When grinding at vertical angles on a magnetic chuck it is frequently the practice to tilt or block up one edge of the chuck, which does not provide a substantial arrangement that is free from vibration. With the grinder equipped with a tilting table the chuck is



Graduations for Tilting Angle Are in Degrees

bolted securely to the table and the entire assembly tilted to the required degree, this arrangement being intended to provide a rigid foundation for the work, resulting in greater accuracy.

Suitable T-slots are provided to accommodate a magnetic chuck, vise and other fixtures, and graduations for the "tilting angle" are given in degrees.

Erie Railroad Contracts for Handling Freight

The Consolidated Freight Handling Co., incorporated by Youngstown, Ohio, capital, has contracted with W. A. Baldwin, director of the Ohio region of the Erie Railroad, to handle the road's less-than-car-load freight through the freight houses at Cleveland, Akron, Youngstown, Warren, Barberton, Ashland and Mansfield in Ohio, Corry, Sharon and Meadville in Pennsylvania and Jamestown, N. Y. The scope of the company's business may be extended to include other points along the Erie. The effect of the arrangement will be to release the Erie from employment of freight house labor at the points where the contracts are operative. The Consolidated Freight Handling Co. will hire its own labor at the rates of pay effective in the various communities. Under terms of the contract, the freight handling company becomes the lessee of local freight houses and adjacent railroad property required for such work.

A similarity in names is causing some confusion, it is explained in a letter to the trade by the Wayne Machinery Co., Inc., Ft. Wayne, Ind., maker of machine tools and woodworking machinery. It appears that there is a Wayne Machine Co. on Ft. Wayne Avenue in Indianapolis, but there is no connection between the Machinery and the Machine companies.

Fluctuations of Steel and Iron Pipe Prices

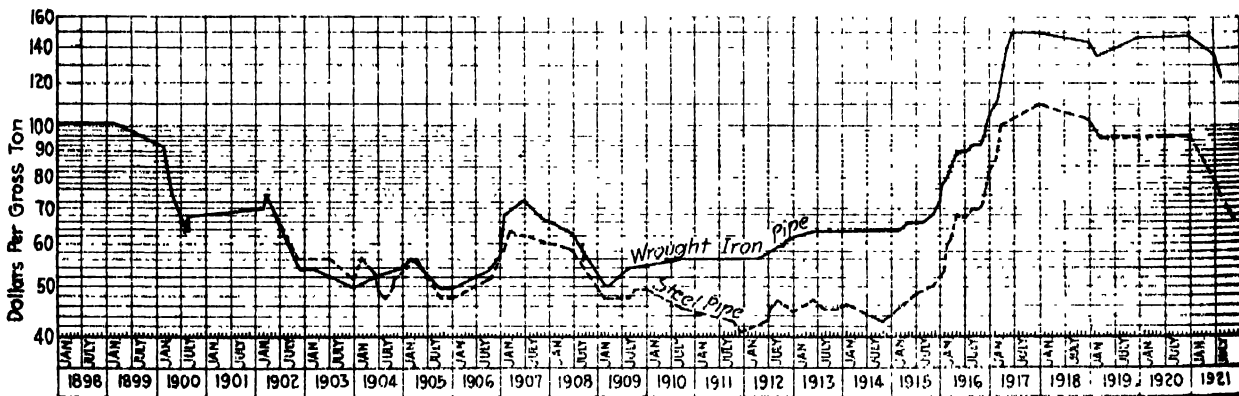
Trend of Quotations from 1898 to 1922 as Shown by Chart and
Tables—Wide Spread Which Was Almost
\$62 Per Ton in 1920

HEREWITH in chart form is told the story of the fluctuation in prices of steel and wrought iron pipe for a period of 23 years, based upon the basing or card discount on carload lots. The prices upon which the chart is based are found in the accompanying tables.

It will be observed that from 1898 to 1902 inclusive, prices of both kinds of pipe ran along about the same. In explanation it might be stated that during this period no very real idea of producing costs existed and so far as then was known costs were supposed to be about the same. This period also saw the real beginning of steel pipe as a competitor of wrought iron

is that while all manner of mechanical devices have been introduced in the manufacture of steel pipe to reduce the amount of hand labor, the making of wrought iron pipe has been and still is largely hand labor, and there has been no saving in production costs which machines would have permitted.

The drift of prices has been in keeping with that of all finished products. Pipe shared in the 1907 boom and in the collapse which followed in 1908 and also the business unsettlement which resulted from the dissatisfaction over the Payne-Aldrich tariff and the change in National Administration in 1912. We find steel pipe down to about \$40 a ton late in 1911, and



Wrought Iron and Steel Pipe Prices, 1898-1922

pipe, and the latter had such a firm grip upon consumers that the struggle for consumptive supremacy was a keen one. It will be observed also that since 1904 steel pipe has sold at a lower price than wrought iron pipe and that the spread between the two kinds widened for a number of years. At the close of 1920 the spread was almost \$62 per ton. The explanation

records of THE IRON AGE at the time note some large sales of line pipe which were made at least \$2 per ton below that figure. The market improved during 1912 and 1913, only to weaken again in the depression which developed in American business just after the outbreak

Wrought Iron Pipe				Steel Pipe			
Date of Change		Dollars Per Gross Ton Net, F.O.B. Mill		Date of Change		Dollars Per Gross Ton Net, F.O.B. Mill	
Sept. 1, 1898	..55	\$100.80		Feb. 21, 1900	..59	\$91.84	
Dec. 26, 1898	..55	100.80		May 1, 1900	..67	73.92	
Feb. 15, 1899	..55	100.80		July 1, 1900	..70	67.20	
Mar. 1, 1900	..59	91.84		Aug. 1, 1900	..72	62.72	
May 15, 1900	..67	73.92		Sept. 1, 1900	..70	67.20	
July 1, 1900	..70	67.20		Mar. 1, 1902	..69	69.44	
Aug. 25, 1900	..72	62.72		Mar. 15, 1902	..67	73.92	
Sept. 1, 1900	..70	67.20		Nov. 12, 1902	..75	56.00	
Mar. 1, 1902	..69	69.44		Apr. 1, 1903	..75	56.00	
Mar. 15, 1902	..67	73.92		July 18, 1903	..75	56.00	
Nov. 12, 1902	..76	53.76		Aug. 1, 1903	..75	56.00	
Mar. 16, 1903	..76	53.76		Dec. 31, 1903	..77	51.52	
Dec. 31, 1903	..78	49.28		Feb. 1, 1904	..76	53.76	
Mar. 1, 1904	..77	51.52		Mar. 1, 1904	..75	56.00	
Mar. 12, 1904	..76	53.76		July 1, 1904	..78 1/2	48.16	
June 1, 1904	..77	51.52		Sept. 3, 1904	..79	47.04	
Jan. 2, 1905	..76	53.76		Oct. 19, 1904	..78	49.28	
Feb. 1, 1905	..75 1/2	54.88		Nov. 1, 1904	..77	51.52	
Mar. 1, 1905	..75	56.00		Jan. 27, 1905	..76 1/2	52.64	
Apr. 20, 1905	..74 1/2	57.12		Feb. 1, 1905	..76	53.76	
Oct. 2, 1905	..78	49.28		Mar. 1, 1905	..75 1/2	54.88	
Jan. 1, 1906	..78	49.28		Apr. 20, 1905	..75	56.00	
Oct. 12, 1906	..76	53.76		Oct. 2, 1905	..79	47.04	
Dec. 19, 1906	..75	56.00		Nov. 1, 1905	..79	47.04	
Jan. 25, 1907	..70	67.20		Jan. 1, 1906	..79	47.04	
June 10, 1907	..68	71.68		Oct. 12, 1906	..77	51.52	
Oct. 19, 1907	..70	67.20		Dec. 4, 1906	..76	53.76	
June 10, 1908	..72	62.72		Dec. 20, 1906	..75	56.00	
Feb. 19, 1909	..78	49.28		Jan. 24, 1907	..74	58.24	
Mar. 15, 1909	..78	49.28		Feb. 4, 1907	..74	58.24	
Aug. 4, 1909	..76	53.76		Mar. 14, 1907	..72	62.72	
Oct. 1, 1910	..75	56.00		June 10, 1908	..74	58.24	
Oct. 2, 1911	..75	56.00		Feb. 19, 1909	..79	47.04	
Mar. 1, 1912	..75	56.00		Sept. 1, 1909	..79	47.04	
Sept. 2, 1912	..74	58.24		Oct. 1, 1909	..78	49.28	
Oct. 1, 1912	..74	58.24		Jan. 1, 1910	..78	49.28	
				Oct. 1, 1910	..80	44.80	
				Oct. 2, 1911	..81	42.56	
				Dec. 1, 1911	..82	40.32	
				Dec. 15, 1911	..82	40.32	
				June 1, 1912	..81	42.56	
				July 1, 1912	..81	42.56	
				July 24, 1912	..80	44.80	
				Sept. 10, 1912	..79	47.04	
				Jan. 1, 1913	..80	44.80	
				Apr. 12, 1913	..79 1/2	46.92	
				May 27, 1913	..79	47.04	
				Aug. 8, 1913	..80	44.80	
				Oct. 27, 1913	..80	44.80	
				Feb. 2, 1914	..79 1/2	46.92	
				Apr. 20, 1914	..80	44.80	
				Nov. 2, 1914	..81	42.56	
				Feb. 11, 1915	..80	44.80	
				May 1, 1915	..79	47.04	
				Nov. 1, 1915	..78	49.28	
				Jan. 4, 1916	..77	51.52	
				Jan. 20, 1916	..76	53.76	
				Feb. 15, 1916	..75	56.00	
				Feb. 29, 1916	..74	58.24	
				Mar. 15, 1916	..73	60.48	
				Mar. 29, 1916	..72	62.72	
				Apr. 21, 1916	..70	67.20	
				July 24, 1916	..70	67.20	
				Sept. 7, 1916	..69	69.44	
				Nov. 1, 1916	..69	69.44	
				Nov. 15, 1916	..68	71.68	
				Dec. 1, 1916	..66	76.16	
				Dec. 30, 1916	..64	80.64	
				Feb. 14, 1917	..62	85.12	
				Mar. 5, 1917	..60	89.60	
				Apr. 2, 1917	..44	125.44	
				May 1, 1917	..38	138.88	
				July 2, 1917	..33	150.08	
				Nov. 6, 1917	..33	150.08	
				Jan. 1, 1918	..36	143.36	
				Mar. 21, 1918	..39 1/2	135.52	
				Jan. 17, 1920	..34 1/2	146.72	
				Dec. 15, 1920	..34 1/2	146.72	
				Mar. 1, 1921	..29 1/2	157.42	
				Apr. 13, 1921	..35 1/2	144.48	
				July 7, 1921	..29 1/2	136.52	
				Sept. 1, 1921	..44 1/2	124.32	

of the World War. Then came the war demands, which at their height carried steel pipe to about \$110 per ton and wrought iron pipe to \$150 a ton for the base sizes.

Tubular goods were among the first of the finished steel products to rally from the depression which followed the signing of the armistice, Nov. 11, 1918, and it is doubtful whether there was ever before such a period of insatiable demand as that extending from the spring of 1919 to the summer of 1920. It was largely based on oil and gas well development, which had been restricted during the war, and because of the hindrances to production from labor and transportation troubles, not to mention considerable speculative buying, previously unheard-of prices were reached in oil country and line pipe. This development affected prices for merchant or standard pipe, for, of course, the very fancy prices which ruled for oil well and line pipe diverted production largely into those lines. The chart does not record this phase of price fluctuations since it deals only with the base discount on butt weld merchant pipe and card discounts had only slight relation to the prices which most independent companies obtained for oil country pipe in 1919 and 1920.

Since the latter part of 1920, down to date, the trend of prices has been steadily lower. Independent steel pipe makers, who throughout 1920 had quoted standard pipe at \$7 per ton above the price of the National Tube Co., as of Jan. 1, of this year, went back

to the National Tube Co. schedules. With business slack, observance of card discounts was slight and in the April effort at price stabilization prices were reduced, the base discount going to 62½ per cent, effective April 13, as compared with 57½ per cent, which the National Tube Co. had quoted from March 21, 1919, and the independents from Jan. 1, 1921. This cut failed to stimulate business and another one or two points, equal to \$4 per ton, was made, effective July 7. Still the demand failed to respond and with more sellers than buyers and none too strict observance of the regular discounts, another cut, this time of \$8 per ton in the "official" quotation, was made as of Sept. 16. This quotation was officially maintained until Dec. 15, when another \$5 reduction was made. The wrought iron price was not changed.

Present prices of steel pipe are the lowest which have prevailed in five years, but they still are almost 59 per cent above 1914 average. Peak prices for steel pipe, as disclosed by the price tables reached late in 1917, were 147 per cent above the 1914 averages. The decline in wrought iron pipe has been much slighter than that in steel pipe and the present price per gross ton of the base sizes of \$124.32 compares with the 1914 average of \$62.72, the current price being substantially 100 per cent higher than the 1914 level. Wrought iron pipe at peak prices, which came late in 1920, was 182 per cent above the pre-war average.

Recovering Salable Scrap from Discarded Navy Ships

Government Officials Studying Best Method of Dismantling
Vessels Included in Disarmament Program

SINCE the news was received that the conference for the Limitation of Armament in Washington had agreed not only to restrict the building of battleships within the next ten years but to scrap many of the ships now in service, the question of the best method of demolishing these ships has been under consideration by Navy Department officials in Washington, and also by those companies which have done similar work in this country in the past.

Intimations have come from Washington that no plant in the United States is equipped at present to scrap large warships, and the suggestion has been made that the work might well be done in England, where some plants, it is stated, have done work of this character on an extensive scale.

The steel trade in some quarters will undoubtedly take the point of view that it would be unfortunate to

send these ships abroad for demolition, inasmuch as the steel scrap which can be obtained from them is of value to American steel plants. Moreover, the production of good quality steel scrap has been at a minimum during the past year or more, owing to the general depression in industry, and the several hundred thousand tons of scrap which can be obtained in the demolition of the warships included in the disarmament arrangement will be exceedingly useful, especially if there should be a marked revival of steel manufacture in 1922.

The ships to be scrapped by the United States have a total displacement of 525,850 tons. Companies which have dismantled smaller vessels estimate that the total quantity of old material which can be obtained is about 70 per cent of the displacement tonnage; in this instance more than 360,000 tons will be available for



A Destroyer Being Dismantled at the Hitner Yard. In the background is an old wooden frigate, which has been stripped of salable metal parts



The Upper Works of a Discarded Naval Vessel Are First Dismantled and Then the Hull Plates Are Removed

re-melting. The great bulk of this is steel, but a considerable tonnage of brass and other non-ferrous metals is also obtained.

Most of the ships which in the past have been sold by the Navy Department for scrap have been light cruisers, monitors, destroyers and sub-chasers. Many of the latter were destroyed after the late war, their use in the peace-time activities of the Navy not being



This Row of Destroyers Was Recently Scrapped at the Hitner Yard at Bridesburg, near Philadelphia

required. The destroyers were bought from the Government at about \$10,000 each, and the work of dismantling them was done at yards on the Atlantic and Pacific Coasts. The Henry Hitner's Sons Co., whose plant is at Bridesburg, on the Delaware River near Philadelphia, has done much of this work, and probably will be a bidder for the ships included in the disarmament program when they are offered for sale.

In some instances the Navy has used discarded ships for targets. After sinking them in shallow water they have been raised and then sold for scrap. Some have been converted into freight vessels, pleasure yachts, etc., but the terms of the present international agreement will doubtless provide for complete destruction, so that not even the hulls will remain.

The method which the Hitner company has employed in demolishing naval vessels is to moor them alongside dock at its Bridesburg plant; then strip the upper-works of each ship, including machinery. In the latter, much of the most valuable non-ferrous metal scrap is found. When nothing but the hull remains, the top row of plates is removed by electric or oxy-acetylene cutting. This work is continued down as close to the water line as possible, and then the remainder of the hull is towed up on the beach at high tide, and at low tide another row of plates is removed. This process is repeated at each high and low tide until the keel of the ship can be towed onto the land, when demolition is completed. The steel is broken up into charging box sizes in the Hitner yard, and shipped to steel plants for re-melting.

A serious problem in connection with the demolition of large ships will be the removal of heavy armor plate.

If the Navy Department follows its usual method, the ships to be scrapped under the disarmament program will be sold to the highest bidders. Before the results of the Limitation of Armament Conference had become known, the Navy Department had decided to sell some of its obsolete ships, and lists were prepared and published. Bids were taken on about a dozen ships on Dec. 15, and another list, on which bids will be opened Jan. 16, includes some battleships listed in the disarmament program, such as the Maine and Missouri. Upon the results of this latter sale will possibly depend, to some extent, the method that the Navy Department will employ for the disposal of the remainder of the ships to be dismantled.

New Record for Coal Production

UNIONTOWN, PA., Jan. 23—A new record for coal production for any one mine during a single month in the history of the Connellsville bituminous region, was set up at the Ronco plant of the H. C. Frick Coke Co., during December. Working twenty-five days during the month, 134,000 tons of coal was hoisted from the Ronco shaft. Establishment of this record in the face of present industrial conditions is remarkable. All of the coal was shipped by river to the Clairton by-product plant of the Steel Corporation. It is planned to increase production at the Ronco plant until a monthly output of 150,000 tons is reached, a record expected to be attained within six months. W. J. Culleton is superintendent at the plant.

At other Frick plants in the region, production is being maintained on approximately the same basis as has been maintained during the past three months: 35 per cent coke and 55 per cent coal.

Independent coal and coke output in the region continues to show a slight increase. No change, however, in the production scale is noted at plants of W. J. Rainey, Inc.

Prospects of a national coal mining strike the latter part of March will not affect the Connellsville region, except in increase production. Present wage scales in this region are considerably under the scales in the union fields, and production has been maintained on a higher general average than in union fields. No changes in scales are expected during the first quarter in the region.

The Seaboard Steel & Iron Corporation, William F. Holl president, which was organized in Baltimore in June, 1921, is now occupying a new warehouse at Ostend and Paca streets. The building is 155 x 170 ft., divided into five bays, each of which is provided with overhead crane as well as other equipment for handling and general steel warehouse service. The company will carry a full line of steel, including structural shapes, tubes, cold rolled, cold drawn and alloy steel, tool steel, shafting, sheets and plates, rivets, etc.

Pittsburgh Foundrymen's Association

PITTSBURGH, Jan. 22.—In his talk before the Pittsburgh Foundrymen's Association at its regular monthly meeting at the General Forbes Hotel, last week, Herbert M. Ramp, superintendent of foundries, American Locomotive Co., Dunkirk, N. Y., whose subject was "Defective Castings," declared that his experience had convinced him that 50 per cent of the defective castings were directly attributable to the sand or the sand mixture used. There should be the same care in the inspection of sands as there is of other materials, the speaker urged, pointing this out as one of the duties of the foundry chemist. He made a strong plea for a greater factor of safety, not only with regard to sands but with flasks and patterns as a means to the prevention of bad castings, indicating the great care that usually was exercised in providing the machine shop with the latest and most up-to-date tools, which was quite the reverse of what was done in the matter of equipping the foundry.

Mr. Ramp said the management was often as much to blame for bad castings as were the foundrymen. The management could help matters by taking only such business as the foundry was adapted to handle, pointing out that strange work in the best of hands was subject to loss and delays. Too much should not be expected from the molders who have not control over the materials provided them. He asserted that users of castings rather than the makers had written the chemical standards now in use. Chemistry, he claimed, had not been established and that it still was necessary to revert to practical tests as a way out of troubles. In this connection he urged the importance of uniformity of materials.

Benjamin Fuller, Titanium Alloy Mfg. Co., Niagara Falls, N. Y., a former president of the Pittsburgh Foundrymen's Association and who some time ago was made a life member of the organization, was present and spoke in a reminiscent vein. C. S. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa., George B. Koch, superintendent of foundries, Pennsylvania Railroad, Altoona, Pa., and Samuel D. Sleeth, foundry superintendent, Westinghouse Air Brake Co., Wilmerding, Pa., also spoke.

It was announced by C. S. Koch that the annual convention of the American Foundrymen's Association would be held May 22 and provided the proper facilities could be secured, would be held in Cleveland.

Meetings of Technical Sections

Dexter Kimball, president American Society of Mechanical Engineers, was the guest of honor at a banquet and reception tendered by the Milwaukee Society on Saturday evening, Jan. 21, at the Milwaukee Athletic Club. At the regular monthly meeting and dinner held Jan. 18, Fred A. Parsons, chief engineer Kemp-smith Mfg. Co., gave an illustrated address on "Power Required for Cutting Metal."

At a recent meeting of the Rockford, Ill., chapter of the American Society for Steel Treating, Otto F. Muehlemeyer, metallurgist of the Barber-Colman Co. of that city, presented an exhaustive paper on the hardening of steel.

A joint dinner of Boston sections of the American Institute of Electrical Engineers, American Society of Mechanical Engineers, and American Society of Heating and Ventilating Engineers was held Tuesday evening, Jan. 24, at the City Club, Boston. Following the dinner, W. L. Saunders and Henry de B. Parsons, New York, discussed the Great Lakes-St. Lawrence tide-water project.

S. P. Rockwell, metallurgical engineer, Hartford, Conn., inventor of the Rockwell hardening tester, covered in a thorough manner the subject of carburizing and case hardening, at a meeting of the Boston Chapter, American Society for Steel Treating, Friday evening, Jan. 20, at the Boston City Club. He paid special attention to soft spots, cracks, etc., giving causes and remedies. Lantern illustrations were used.

J. P. Gilligan, president of the American Society

for Steel Treating, was the speaker at the January meeting of the Cincinnati chapter held on Jan. 23 at the plant of the R. K. LeBlond Machine Tool Co. Mr. Gilligan's subject was "What Happens to Steel When You Quench It?" and his address was illustrated by stereopticon views. A dinner, with music and motion pictures, rounded out the program.

Harry F. Smith, consulting engineer of the Smith Gas Engineering Co., Dayton, Ohio, gave an illustrated talk on "Producer Gas" before a joint meeting of the Engineers' Club of Cincinnati and the Cincinnati section of the American Society of Mechanical Engineers on Jan. 19.

Dr. Zay Jeffries, Cleveland, Ohio, was the speaker at the January meeting of the Cincinnati section of the American Chemical Society on Jan. 18. His subject was "Some New Developments of Metallography," and in the course of his lecture he described the application of the X-ray in the crystal analysis of metals. G. K. Elliot presided at the meeting, which was held in the chemistry building of the University of Cincinnati.

Industrial Engineers Spring Convention

The national spring convention of the Society of Industrial Engineers will be held at the Hotel Statler, Detroit, April 26 to 28. The major subject will be the influence of industrial engineering upon the earnings of capital and labor.

A general survey covering the effects of industrial engineering upon the safety of invested capital, the regularity of dividends, the continuity of production, the satisfaction of labor and the protection of the public will be considered at the opening meeting under the subject of "How Industrial Engineering Serves Industry." Another topic at this session will consider how industrial engineering serves the chief administrator. This will be followed by an evening meeting on industrial engineering as serving the executive, the sales manager and the factory manager.

Sectional meetings of the sales, production, finance and accounting, and industrial relations groups will be held as heretofore, and as also a banquet, which is scheduled for the evening of April 27. The fatigue elimination committee will hold a dinner meeting, following which an evening session will be devoted to the subjects of how industrial engineering reduces production costs, and how it increases the productivity of each industrial unit. Another topic of this meeting will be "Practical Tests of Employees."

An afternoon session with the topic, "How Can Industrial Engineering Increase the Profits and Insure the Stability of Both Capital and Labor?" will cover the subjects of the conservation by the workmen and by the management of material, of plant and equipment, of labor and of workmen. At these meetings 15-min. papers will be read, which will be followed by 30 min. of discussion on each subject.

An unusual banquet is announced by the Providence Engineering Society to be held on Tuesday evening, Jan. 31, at the Narragansett Hotel, Providence. A part of the novelty will lie in the appearance in their initial performance of the "P. E. S. Players." Short addresses are also scheduled. One of these is by Floyd W. Parson, editorial director *Gas Age Record*, on "The Engineer in Public Service," and another by Daniel A. Mackay, captain of the Northwest Mounted Police, on "Public Service in the Northwest." Horace T. Almy, City Engineer's Office, Providence, is in charge.

The New England Iron and Hardware Association will hold its twenty-ninth annual banquet Tuesday evening, Feb. 7, at the Hotel Somerset, Boston. A reception will be held at 6 p. m. and dinner at 6.30 o'clock. Frank W. Brigham, Bethlehem Steel Co., Boston, is chairman of the committee of arrangements.

The annual meeting of the Iron and Steel Institute will be held May 4 and 5 at the House of the Institution of Civil Engineers, London, England. The usual dinner will be held on the evening of May 4.

Machine for Welding Large Thin Tubing

A new oxy-acetylene tube-welding machine for quantity production of large diameter, thin-gage tubing has been brought out by the Davis-Bournonville Co., Jersey City, N. J. It is intended for use in tube plants where it will be set up and used for long runs on one size of tubing only.

The maximum capacity is 6 in. diameter, 10-gage tubing. By using rolls grooved to the diameter tubing



Oxy-acetylene Tube Welding Machine for Quantity Production. The maximum capacity is 6 in. diameter, 10-gage tubing

desired the machine can be set up for any size within the capacity. Rolls for all diameters of tubes are of the same size overall, the mean center distances of the mating gears remaining always the same.

The machine has two pairs of rolls, one set being the feed rolls and the other the welding rolls. The drive is by belt to the cone pulley mounted on a shaft, as shown in the accompanying illustration, a pinion on this shaft driving in turn a spur gear keyed to a worm shaft, carrying two worms. Motion is transmitted to the feed and the welding rolls through worm wheels mounted on the spindle of each pair of rolls. The worm wheel driving the feed rolls is in a vertical position and that driving the welding rolls, in a horizontal position. The back welding roll is fixed in place and the front roll is adjustable, the spindle bearing being in a slide, the position of which is controlled by a screw and handwheel. The feed rolls are also adjustable. Annular depressions are provided on top of the welding rolls for water cooling and a circulatory system can be attached where required.

The welding torch is the company's multiple jet, water-cooled type, both the tip and the barrel of the torch being cooled by circulation of water. The torch holder provides for vertical and horizontal adjustment of the torch and for varying the angle at which the tip is presented to the seam to be welded.

Tax Claims for Machinery Amortization

Chronometric valuations was the subject of an address by William F. Wooster, vice-president Lloyd-Thomas Co., appraisers, 75 Fulton Street, New York, before the Jan. 19 dinner and meeting of the New York section of the Industrial Cost Association at Keen's Chop House, New York. Chronometric valuation, said Mr. Wooster, is valuation established over a period of time. Invested capital, depreciation, amortization and amended returns to the Government were

covered. Mr. Wooster laid particular stress upon amortization claims and amended returns based upon a revision of depreciation allowances. Amortization claims on machinery and other equipment used for war work and no longer of value for use in production, but with a resale or scrap value, must be filed before March 15 to be considered by the Government.

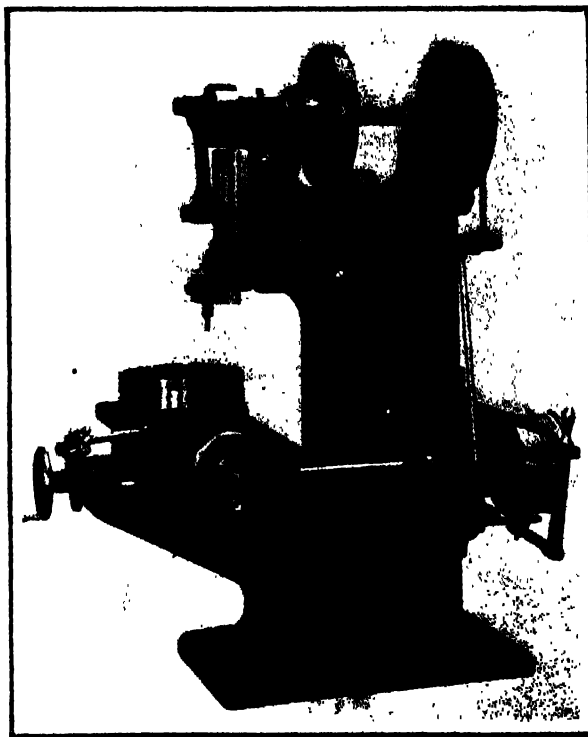
Mr. Wooster explained the governmental attitude on returns for depreciation and showed how by refiguring the depreciation and valuation of a plant from the time of its opening to the present it is possible sometimes to save considerable sums on returns. The address was followed by general discussion of amortization and amended returns.

New Die Slotting Machine

A vertical slotting machine for use in making round, square and irregular-shaped punches and dies has been placed on the market by the Peters-Bossert Co., doing a general machining business, Cincinnati.

The machine is shown in the accompany illustration. The ram is incased in a vertical slide, fitted with a gib, and driven by an adjustable crank on the main shaft which carries a crank pin that can be adjusted to give any length of stroke up to 4 in. The ram is also slotted and fitted with an adjustable pin to change the location of the stroke to suit the work.

The slide is hinged on the upper end to permit movement of the ram on the lower end for obtaining the required amount of clearance. The lower end of the slide is connected with a toggle joint arrangement operated by an eccentric on the main shaft, which in turn moves the ram forward, while in motion on a curve on the down stroke, and clears the cut on the up stroke. This, it is claimed, produces an arc-cut in dies, so much required by modern die makers. This clearance can be changed to suit requirements. By means of the positive clearance thus provided, the use of the clapper box



The Slide is Hinged on the Upper End and Connected with Toggle-Joint Arrangement at the Lower

has been successfully eliminated, it is said, and with it the objectionable features of the clapper box.

By the use of a pull pin, the cam can be changed quickly to make the straight cut for the punch part. Cross, longitudinal and circular hand feeds are provided, each being operated with a separate screw and hand-wheel. Power feeds are also furnished. The machine has a variable gear speed box mounted inside of the frame, giving three changes of speed, operated by a shifting lever located outside of the frame.

American Sheets Largely Used in Japan

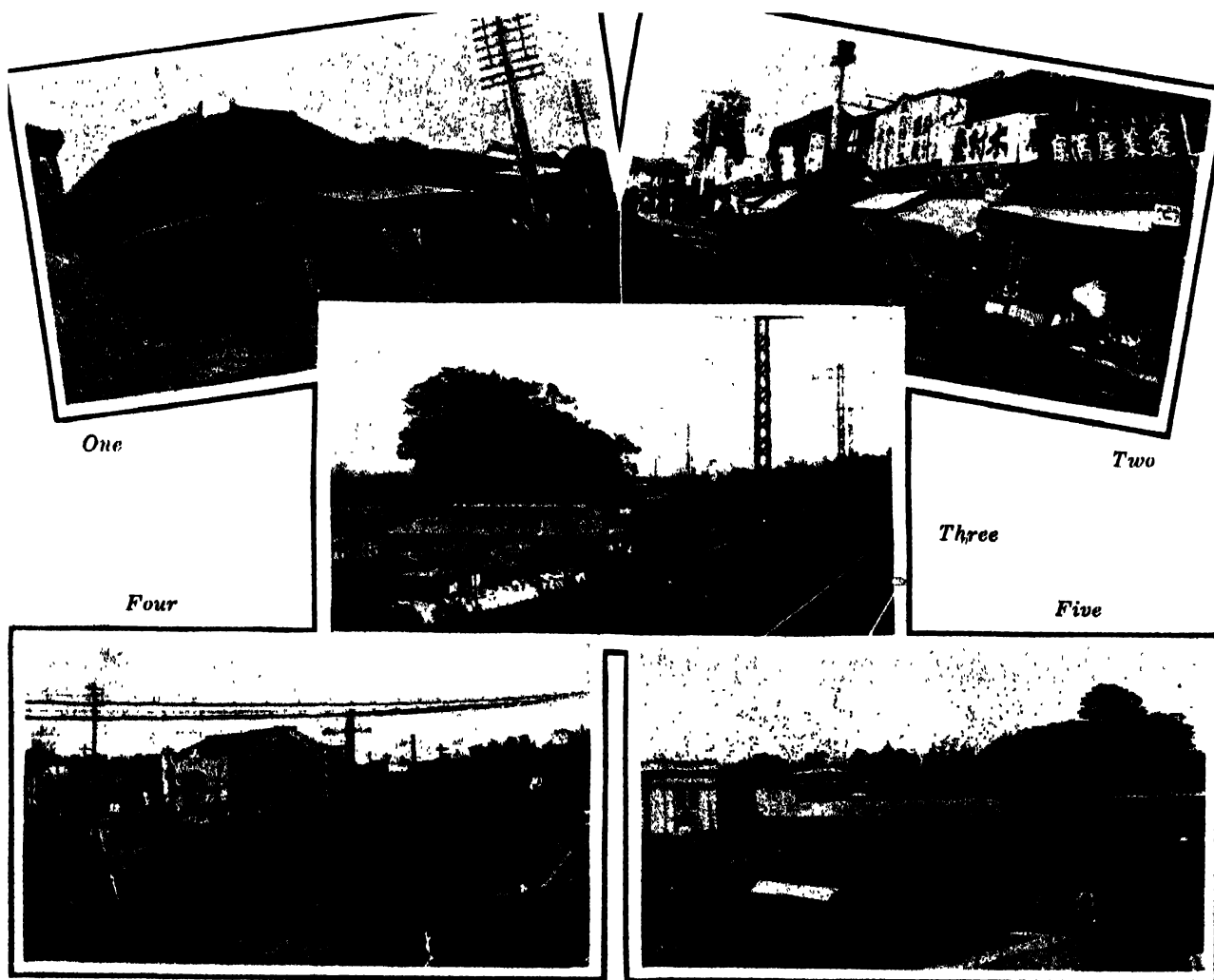
New Fire Laws Will Cause Increasing Imports—Galvanizing Done in Japanese Plants—Great Variety of Building and Other Uses

TOKYO, JAPAN, Dec. 21, 1921.—An interesting development of American trade with Japan has been a notable increase of exports of thin black sheets from the United States to this country in the past half year. These sheets are employed for a great variety of purposes and new uses are constantly being discovered by the Japanese people. It is estimated that Japan imported fully 100,000 tons of American sheets in 1921. With the exception of a very small proportion of the tonnage imported these thin sheets are galvanized in Japan. Already a number of Japanese galvanizing plants are in operation, with a total production of about 9000 gross tons per month, besides which a company, having works at Kawasaki, at which it rolls black sheets as well as galvanizes them, has a present monthly capacity

of about 300 tons of No. 30 gage sheets. This output will be increased to about 500 to 600 tons per month by the middle of 1922. The cost of galvanizing imported black sheets is understood to vary from Yen 0.30 to 0.40 (at present exchange the equivalent of about 14 to 19 cents) per sheet of 6 x 3 ft.

Sheets Used to Reduce Fire Risk

The principal use to which thin sheets are applied in Japan is that of providing a relatively cheap substitute for the highly inflammable material of which from time immemorial Japanese dwelling houses and other buildings have been constructed. While the Japanese have adopted western architecture and modes of construction for their public buildings, business offices and



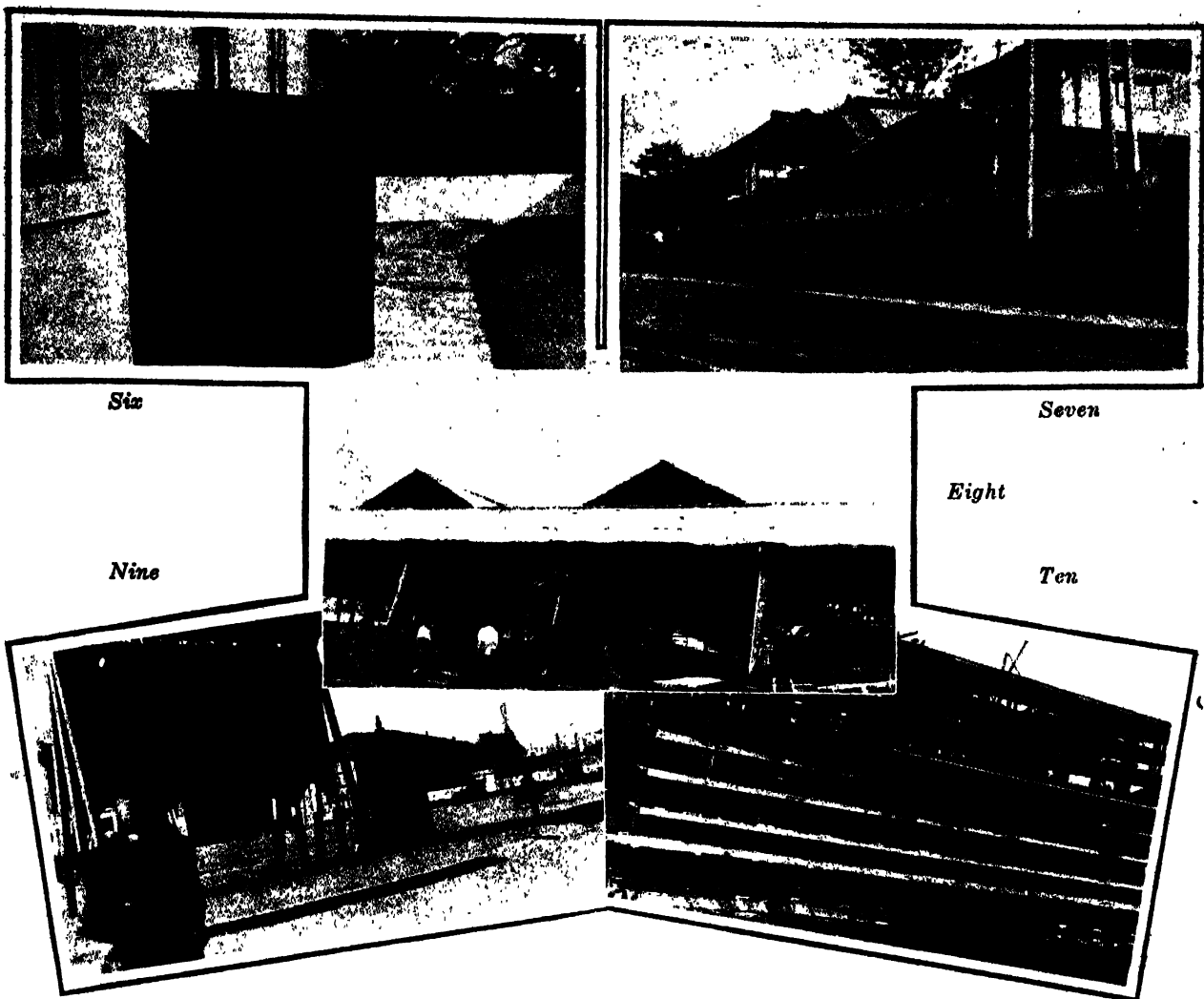
1. Throughout the country, the thatched roofs of innumerable small cottages are being gradually replaced by galvanized sheets. The illustration shows this transition in progress—galvanized sheets at the top of the thatched roof shown in the foreground, corrugated sheets for the coping, and galvanized roofing and siding on the other buildings in the background of the picture.

2. A common street view in the environs of Tokyo. Over the shops are signs made of sheets, the frames of which are usually of wood. Some of these signs are of plain black sheets, painted; most of them, however, are of galvanized sheet steel. The small carts for merchandise delivery, shown in the center of the picture, are also constructed of galvanized sheets.

3. A typical building, covered with galvanized sheets to comply with the regulations requiring that such buildings in close proximity to railroads be covered with non-inflammable material.

4. The junction of the Tamagawa Railway with a branch line of the Imperial Government Railways. The building in the background is the Shibuya moving picture house, roofed and sided with plain galvanized sheets, the top being painted but the sides unpainted. In the left foreground are several signboards made of galvanized sheets.

5. A combined store and dwelling house, recently erected close to a railroad track, almost entirely constructed of galvanized sheets.



6. In every Japanese home there is at least one "tansu," or clothes chest. The one shown is trimmed with thin sheets, painted.

7. Fence surrounding a Buddhist temple. The lower part is made of corrugated sheets. The roof of the second building shown is a combination of tiles and plain galvanized sheets, which are painted red. This feature is exceptional, as while the use of paint for the preservation of steel material is spreading in Japan, it is by no means general.

8. A section of a temporary building, covered with galvanized sheets, which was constructed in the center of the city

of Tokyo, close to the central railroad station, for the celebration of the 50th anniversary of the operation of railroads in Japan. It had seating capacity and dining room accommodation for over 3000 persons.

9. A map of the city of Tokyo, facing the Central Railroad station, is painted on a huge sign made of galvanized sheets.

10. The Marunouchi Building, in course of construction. It is the largest building in the Far East, and in its construction upward of 5000 tons of American structural steel have been used, aside from the large amount of galvanized corrugated sheets as shown.

factories in the large cities, they very generally have retained for their homes the ancient, time-honored types of structure and modes of construction. Thus in Tokyo, which has a population of 2,000,000 and an area of 31 sq. mi. (the boundaries of which will soon be extended to include, under a single municipal government, an area of over 100 sq. mi. and a population of 3,500,000) the curious contrast is presented of a large number of public and business buildings similar to those of the great cities of Europe and America, in close proximity to, in fact surrounded by, immense numbers of the homes of the people—small wooden bungalows of one or two stories, constructed of highly inflammable material, with paper windows, charmingly quaint and old-fashioned, but highly dangerous in the event of a conflagration. In fact, disastrous conflagrations are frequent in Japan.

In May, 1919, regulations were promulgated in many districts, requiring the use of non-inflammable material, such as tiles or steel sheets, for the roofs of all new buildings, and also requiring the reconstruction, within four years, with such material, of old roofs in congested districts and along or in close proximity to railroads. The enforcement of these regulations, however, is within the discretion of the police authorities in each locality, depending upon circumstances. As the present cost of galvanized sheets is about one-half that of tiles covering an equal area, and there is a saving in time and labor in the installation of the former as compared

with the latter, there has been developed a heavy and constantly increasing demand for galvanized sheets for roofing purposes. Another advantage is that sheets are considered more durable than tiles or slate, particularly in the northern part of the country, where heavy snows prevail and tiles or slate have proved inadequate to withstand the added stress of the weight of snow. On the other hand, slate and tiles are largely used in southern Japan, where climatic conditions are less severe.

The accompanying photographic views give a good idea of the conditions which already have led to a large use of thin sheets and that make it quite certain that American sheet mills will be called on to make further good-sized shipments to Japan in the future.

Varied Uses of Galvanized Sheets

In a good many cases a transition is seen from the ancient style of construction of Japanese dwelling houses to what may be called the semi-foreign style, the entire covering of the houses being of galvanized sheets. An interesting feature is that plain flat sheets are rapidly replacing the corrugated variety. Both, however, are still largely used for roofing and siding of buildings generally, from moving picture houses and other large structures down to the smallest cottage, as also for fencing. Among the many uses of plain galvanized sheets are: for gutters, leaders and drain pipes of buildings; for copings of walls; for lining

wooden pipe; for covering wooden pipe crossing bridges; for stove pipe; for buckets and pails of all sizes, down to as small as one pint capacity; for signboards, replacing wood; for merchandise carts and wagons; for sliding doors; for shutters and double doors for warehouses; for show-case shutters; for replacing wood for paneling purposes; for display boards for posters, and for various kitchen utensils. Black sheets are also used for a variety of purposes, such as stove pipes, both inside and outside of dwellings, although galvanized stove pipe is more frequently used outside, on account of the humidity of the climate; signboards, of black sheets painted, although galvanized sheets are more generally used for this purpose; the Japanese "tansu" or clothes chest, as in the illustration; various kitchen utensils; locks and door trimmings; cheap shovels; stamped ware, and a variety of small articles, such as enameled cups, plates, basins and spoons.

Preference for American Sheets

The thin black sheets imported into Japan come from the United States and Great Britain, but for some

time past by far the greater proportion has been supplied by American manufacturers. While conditions in Great Britain during the past year, and particularly the strike of coal miners and the resulting scarcity and high prices of raw material and fuel, seriously restricted British exports of sheets, the larger share of the Japanese imports of this material secured by American manufacturers has been due, to an important extent, to the superior quality of the American product. In fact, certain Japanese brands of galvanized sheets, known to be obtained by galvanized black sheets of a well-known American brand, command a higher price in the Japanese market than any others. One galvanizing company in Tokyo brands its galvanized sheets with a red pigeon when made from American black sheets, and with a green pigeon when made from English black sheets. An additional price is obtainable for the former, even though the latter have undergone an extra process of re-annealing, to make them suitable for the purposes for which they are intended. This additional operation is unnecessary in the case of the American sheets of the make referred to above.

NEW MILL CONSTRUCTION

Extensive Improvements of Wheeling Steel Corporation at Steubenville and Portsmouth

WHEELING, W. VA., Jan. 23.—Steel manufacturers here commonly take the view that good business cannot be expected until the second half of the year. It is pointed out that so long as the railroads are bound hand and foot by the Government, and nothing is being done toward their financial rehabilitation, not much demand can reasonably be expected from that source. Attention also is directed to the financial distress in the important agricultural districts of the country, which naturally spells little if any buying of implements until the farmers have money, and they hardly will be thus provided until this year's harvests are gathered and begin to find their way to market. In addition to these factors is the belief that few investors will care to capitalize the current labor charges in new construction and that consequently much needed new building will be deferred until labor costs are more nearly in line with those for building materials. There must be liquidation not only of building trade labor rates, but also of coal prices, miners' wages, railroad freight and railroad labor, it is argued, before confident buying of steel can be expected, and these problems are likely to be difficult of solution and also to take considerable time.

Wheeling Steel Corporation officials believe that eventually there is going to be a good steel market, judging from the plant betterments and extensions now in progress at the works at Steubenville and Portsmouth, Ohio. Contract for the buildings to house the rod and wire mill at the latter point was placed several weeks ago. With that plant completed, the company will not only be able to supply the requirements of its subsidiary, the Wheeling Corrugating Co., for pails, barrels, etc., but through the latter, which has warehouses in various parts of the country, will become a factor in the wire products market. For this plant a continuous rod mill of somewhat special design, will be furnished by the Morgan Construction Co., Worcester, Mass. Much of the wire drawing, fence and nail machinery has been secured. There remains to be installed pickling, annealing and galvanizing equipment. The company will build also at Portsmouth a boiler plant and a gas producer and will increase its storage facilities.

At Steubenville the enlargement of the open-hearth furnaces has compelled increases in the rolling equipment to take care of the greater output of steel. A 35-in. blooming mill will be furnished by the Mackintosh-Hemphill Co., Pittsburgh, equipped with its latest

type of manipulator, having many refinements of the original, which by the way was developed at the Portsmouth, Ohio, works of the Wheeling Steel Corporation. The Wheeling Mold & Foundry Co. has the order for the tables and transfers, while the shears and intensifier will be furnished by the Morgan Engineering Co., Alliance, Ohio, and not the Morgan Construction Co., Worcester, Mass., as previously reported. The latter some time ago took the order for an 8-stand 19-in. continuous bar mill. Both the blooming and continuous mills will be driven by 4-cylinder uniflow engines to be built by the Nordberg Mfg. Co., Milwaukee. This will be the first installation of this type of engine for driving a reversing mill, and the results will be watched with considerable interest. The engine for driving the continuous mill is identical with that for the blooming mill, except that it is equipped with a governor.

To supply steam for these engines, the company will build a new boiler house with boilers of 250-lb. pressure and 150-deg. superheat. Ultimately a new power plant will be built and by means of turbo-generators sufficient power will be secured to make the company independent of outside sources of supply. The finishing end of the 45-in. mill is being remodeled. One of the skelp mills is being taken out to make way for a new gas producer which will be connected up with two new 5-hole soaking pits, with electrically operated covers. Plans also call for a new storehouse, more stockyard capacity, and the installation of 10 or 12 new cranes, including two 150-ton ladle cranes. Altogether, the company will spend about \$5,000,000 at the two plants.

Manganese Ore in 1921

The domestic shipments of high-grade manganese ore, containing 35 per cent or more metallic manganese, amounted to about 13,000 gross tons in 1921, of which more than 10,000 tons was shipped from Montana, according to H. A. C. Jenison, of the U. S. Geological Survey. The shipments of ore containing 10 to 35 per cent of manganese amounted to about 72,000 tons, most of which was shipped from Minnesota. The shipments of manganiferous and ferruginous manganese ore amounted to about 14,000 tons.

The net imports for the first eleven months of the year amounted to 386,405 tons of high-grade ore and oxide. Of this Brazil contributed 247,568 tons and India 113,730 tons.

The most important event that may affect the future of the domestic industry was favorable action by the House of Representatives on a proposed tariff on imports of manganese ore of 1 cent per pound of metallic manganese content of ore or of concentrates containing more than 30 per cent of metallic manganese. The measure has not been reported on as yet in the Senate.

Further Gains in Iron and Steel Exports

December Shows Advance Over November—Best Month Since May—Year 1921 Under Half of 1920; Sheets and Welded Pipe Only Items Greater in 1921

WASHINGTON, Jan. 24.—Recovery in exports of iron and steel, which has been gradual since last September, was further reflected during December. The total of 28 products for that month was 134,415 gross tons, valued at \$29,502,440, as compared with 122,290 tons, valued at \$28,543,142, in November. The total for

Exports, January, 1920, to December, 1921, Inclusive

	All Iron and Steel	Gross Tons Pig Iron	Semi-finished Material
Calendar year 1919...	4,239,837	309,682	258,907
January, 1920.....	333,601	18,468	19,937
February.....	308,185	15,739	22,693
March.....	417,216	22,740	30,444
April.....	395,120	14,608	19,032
May.....	420,359	13,082	16,370
June.....	402,707	17,075	29,811
Fiscal year 1920.....	4,212,732	243,126	288,766
July.....	458,866	29,647	17,243
August.....	431,484	22,645	20,920
September.....	409,200	22,724	18,113
October.....	452,015	17,296	11,853
November.....	434,297	13,929	7,042
December.....	498,785	10,055	3,415
Calendar year 1920.....	4,961,861	217,958	216,873
January, 1921.....	547,394	3,710	315
February.....	393,328	1,307	92
March.....	230,635	2,320	1,023
April.....	162,592	1,234	678
May.....	142,551	2,541	749
June.....	119,081	1,689	1,106
Fiscal year 1921.....	4,168,619	129,541	82,549
July.....	86,523	2,744	363
August.....	75,827	2,424	2,447
September.....	95,169	3,078	1,318
October.....	106,582	2,830	153
November.....	122,290	1,299	1,869
December.....	134,415	2,550	250
Calendar year 1921...	2,213,042	28,305	10,363

1921, however, showed a sharp decline of 54 per cent under the exports for 1920, aggregating only 2,213,042 tons, valued at \$607,427,146, as against 4,820,016 tons, valued at \$1,112,835,237, for 1920.

Imports of twelve iron and steel products in De-

Exports of Iron and Steel—Gross Tons

	December 1920	December 1921	Twelve Months Ending December 1920	Twelve Months Ending December 1921
Ferromanganese.....	551	50	3,454	590
Ferrosilicon.....	29	50	632	368
Pig iron.....	9,475	2,450	212,742	27,247
Scrap.....	12,806	4,256	219,250	37,117
Bar iron.....	5,823	132	46,648	12,338
Wire rods.....	4,785	3,338	116,775	18,506
Steel bars.....	63,791	14,779	624,587	188,595
Billets, ingots, blooms.....	3,415	250	216,873	10,363
Bolts and nuts.....	4,334	1,124	38,945	24,230
Hoops and bands.....	4,415	1,639	53,453	20,280
Horseshoes.....	92	37	1,830	614
Cut nails.....	591	58	3,858	1,094
Wire nails.....	12,137	3,720	93,178	28,109
All other nails, includ- ing tacks.....	1,435	316	12,432	4,692
Cast pipe and fittings.....	12,519	1,525	68,863	48,523
Welded pipe and fittings.....	39,192	12,895	284,727	345,279
Radiators and cast house boilers.....	508	133	7,333	3,408
Railroad spikes.....	1,409	372	12,138	8,164
Steel rails.....	52,986	14,943	594,634	322,107
Galvanized sheets and plates.....	11,248	3,936	108,368	55,990
All other sheets and plates.....	1,864	419	32,158	12,414
Steel plates.....	114,554	8,336	920,058	335,857
Steel sheets.....	17,780	34,363	169,244	193,428
Ship plates, punched and shaped.....	2,132	33	42,829	9,570
Structural steel.....	63,496	9,422	493,055	297,022
Tin andterne plates.....	30,955	9,170	226,410	107,726
Barb wire.....	13,891	876	134,174	28,976
All other wire.....	23,103	5,787	190,968	69,335
Total.....	497,765	134,415	4,820,216	2,213,042

cember showed a decline under November, amounting to only 9309 tons, valued at \$1,964,159, as compared with 10,610 tons, valued at \$2,041,772, in November.

For the year 1921 the decline in imports amounted to 71 per cent, when compared with 1920, the amount in 1921 being 121,058 tons, valued at \$28,751,729, as against 417,581 tons, valued at \$50,805,603, in 1920.

Imports of manganese ore in December amounted to 14,900 tons, valued at \$75,770, as compared with 8620 tons, valued at \$49,681, for November. For 1921, imports of manganese ore totaled 401,354 tons, valued at \$3,365,732, as compared with 606,937 tons, valued at \$12,230,922, for 1920.

Exports of machinery for December were valued at \$15,068,096, as compared with \$14,436,849 for November; for 1921 the total was valued at \$290,414,115, as compared with \$462,933,704 for 1920, a drop of 62 per cent.

Plain sheets constituted the heaviest single item of steel exports in December. Japan continues to be the principal buyer of this tonnage, having taken 29,463 tons of the 34,363 tons, or 85.7 per cent; and of the total 1921 exports of sheets of this class, amounting to 193,428 tons, Japan took 127,230 tons, or 65.8 per cent.

Machinery Exports.

	December 1920	December 1921	Calendar Year 1920	Calendar Year 1921
Adding machines.....	\$ 760,160	\$ 115,758	\$ 6,790,407	\$ 2,652,991
Air-compressing machinery.....	681,711	132,263	5,490,397	3,905,694
Brewer's machinery.....	67,630	17,172	522,194	260,028
Cash registers.....	59,278	272,017	5,472,020	2,852,170
Parts of.....	28,931	39,609	469,450	317,133
Concrete mixers.....	182,347	22,502	967,440	861,961
Cotton gins.....	81,186	10,122	433,589	118,463
Cream separators.....	74,108	7,643	1,108,298	414,748
Elevators and elevator machinery.....	172,723	84,622	1,517,537	1,979,504
Electric locomotives.....	18,850	.....	880,430	2,120,712
Gas engines, stationary.....	58,319	48,786	817,925	362,570
Gasoline engines.....	2,893,639	382,122	35,932,693	8,764,199
Kerosene engines.....	.....	66,848	.....	3,894,355
Steam engines.....	5,184,280	2,290,179	57,639,837	35,040,486
All other engines.....	436,585	150,268	4,431,019	2,137,183
Boilers.....	906,399	236,925	8,006,288	4,847,808
Boiler tubes.....	901,975	120,587	6,077,930	3,409,167
All other parts of engines.....	2,041,568	415,561	23,142,104	11,760,508
Excavating machinery.....	182,074	37,997	2,042,727	2,380,591
Milling machinery, flour and grist.....	215,061	69,206	1,896,201	1,512,066
Laundry machinery.....	60,486	32,518	1,136,770	925,319
All other.....	176,276	31,667	903,978	378,745
Lawn mowers.....	96,685	19,597	455,921	446,455
Lathes.....	629,594	130,001	7,875,123	2,677,689
Other machine tools.....	1,264,939	219,708	12,961,243	4,774,394
Sharpening and grinding machines.....	314,298	63,088	3,945,490	1,215,280
All other metal working machinery.....	1,587,881	870,037	18,830,877	10,668,558
Motors, gas and water.....	53,480	75,873	705,037	792,348
Mining machinery, oil well.....	1,113,461	393,349	6,239,264	11,806,713
All other.....	1,037,244	349,056	9,990,999	7,563,544
Paper mill machinery.....	394,854	412,553	8,048,967	2,967,667
Printing presses.....	1,092,571	809,174	9,253,711	8,051,245
Pumps and pumping machinery.....	2,089,030	398,358	13,684,468	11,966,489
Refrigerating and ice making machinery.....	468,711	221,986	3,819,092	1,912,014
Road making machinery.....	143,694	53,878	1,327,752	989,597
Sewing machines.....	1,447,937	564,198	15,581,843	7,306,074
Shoe machinery.....	378,897	112,338	2,683,039	1,797,004
Sugar mill machinery.....	4,064,741	214,981	22,787,977	15,628,283
Textile machinery.....	2,778,340	1,892,662	20,919,614	20,928,333
Typesetting machines.....	541,696	225,675	4,958,787	3,511,455
Typewriting machines.....	2,392,194	873,061	25,041,809	12,431,397
Windmills.....	332,366	49,805	2,356,780	1,758,837
Wood working machinery saw mill.....	177,357	9,705	1,220,028	1,029,363
All other.....	497,789	93,357	3,764,823	2,514,745
All other machinery and parts of.....	11,157,597	3,262,221	96,657,650	67,936,065
Total.....	\$50,321,044	\$15,068,096	\$462,933,704	\$290,414,115

A considerable portion of this tonnage represents thin gage sheets, some of them No. 81½, and the American mills appear to have a good hold of the Japanese market for these gages, readily accepting the business, despite the difficulty of handling this kind of tonnage. Japan also was the leader in the market for exports in several other lines, which is indicated by the accompanying table setting forth countries of exports for December and for the year.

Welded pipe was exported in 1921 in greater quan-

titles than any other steel product, the outgoing shipments aggregating 345,279 tons, with Mexico as the principal market, the movement to that country being 114,148 tons. Japan, however, was the heaviest buyer in December, taking 4271 tons of the 12,896 tons exported. That country also was the heaviest buyer of

tons, while steel rails ranked next with 22,048 tons. The same relative order prevailed in 1920.

Steam engines were the most important December item of exports under the machinery list, their value being \$2,290,179, while textile machinery, with a value of \$1,892,662, ranked second. Lathe exports in December were valued at \$120,001, and for 1921 at \$2,977,689, and "other machine tools" at \$219,708 and \$4,774,294, respectively.

Imports of Iron and Steel—Gross Tons

	December		Twelve Months	
	1920	1921	End'g December	1921
Ferromanganese	5,424	239	59,254	9,057
Ferrosilicon	317	1,160	13,909	7,858
Pig iron	1,861	4,475	123,201	27,601
Scrap	4,132	1,919	140,645	41,469
Cast iron	305	237	4,987	1,913
Structural steel	206	120	1,687	778
Billets, without alloys .....	.....	14	9,299	5,678
All other billets	859	12	16,723	1,310
Steel rails	1,623	894	45,684	22,048
Sheets and plates	98	34	1,792	1,976
Tin andterne plates	55	63	400	454
Wire rods	241	142	5,847	916
Total	15,723	9,309	417,581	121,058
Manganese ore and oxide ..	64,748	14,900	606,937	401,354

tin plate for both December and 1921, taking 5974 tons of the 9170 tons exported in December, and 31,077 tons of the 107,726 exported during the year. Rail exports also found their principal market in Japan in December, shipments of 9650 tons out of a total of 14,943 going to that country. It ranked second for the

Iron and Steel Exports for Five Years

	Gross Tons
*1917	6,227,737
1918	5,338,037
1919	4,386,201
1920	4,820,016
1921	2,213,042

*Record year.

yearly exports of rails, taking 42,239 tons of the total of 322,107, China leading with 45,848 tons.

In only two items did 1921 exports exceed those of 1920: Welded pipe and fittings accounting for 345,279 tons against 284,727 tons in 1920; steel sheets amounting to 193,428 tons against 169,244 tons in 1920. Welded pipe and fittings represented 15.6 per

Exports to Principal Countries of Leading Steel Products, in December and in the Year 1921

	December, 1921		Year 1921	
	Gross Tons	Gross Tons	Per Cent of Total	
Cast Pipe				
Mexico	600	16,889	34.8	
Cuba	454	8,427	17.4	
Welded Pipe				
Mexico	3,165	114,148	33.1	
Japan	4,271	29,017	8.4	
United Kingdom	635	14,769	4.3	
Argentina	588	12,405	3.6	
Steel Rails				
China	76	45,848	14.2	
Japan	9,650	42,239	13.1	
Canada	2,242	23,082	7.2	
Honduras	1,037	12,951	4.0	
Galvanized Sheets				
Canada	1,150	20,915	37.4	
Philippine Islands	290	5,867	10.5	
Plain Sheets				
Japan	29,463	127,230	65.8	
Canada	1,888	33,403	17.3	
Steel Plates				
Canada	6,331	106,694	31.8	
United Kingdom	438	51,784	15.4	
Japan	542	31,037	9.2	
Structural Steel				
Canada	3,883	59,782	20.1	
Japan	835	48,827	16.4	
Tin Plate				
Japan	5,974	31,077	28.8	
Canada	1,513	24,044	22.3	

cent of the 1921 outgo, compared with 5.91 per cent in 1920. Steel sheets were 8.74 per cent of the total in 1921 and 3.51 per cent in 1920.

Pig iron imports for December, amounting to 4475 tons, represented almost half of the total inbound shipments of iron and steel products for the month. Except for scrap, pig iron was the heaviest single item imported for the year 1921 also, the total being 27,601

CENTRIFUGAL CASTING OF PIPE

United States Cast Iron Pipe & Foundry Co. to Use De Lavaud Process

The United States Cast Iron Pipe & Foundry Co. has purchased the exclusive rights for the use of the De Lavaud process for making cast iron pipe centrifugally in the United States and its possessions and in Cuba. This arrangement was recently made with a Toronto, Canada, syndicate at the head of which is Gordon Perry.

A demonstration of one of the De Lavaud machines was recently conducted at the cast iron pipe company's plant at Burlington, N. J., where 6-in. pipe 12 ft. long was produced, one every five minutes. For the company's plant in Birmingham, Ala., a contract has been made for the installation of five De Lavaud machines. These installations will be made as rapidly as possible. The machines will be of such size that 6-in., 8-in., 10-in. and 12-in. pipe can be produced. It is expected that by their use 25 men will be able to turn out 600 lengths of pipe a day with no material necessary except molten iron, whereas under the present system of sand casting it takes approximately 80 men to make 400 lengths of pipe, and there is a considerable molding and core-making cost in labor and materials. In both plants molten iron from cupolas will be used. The practicability of the De Lavaud process has been demonstrated in the operations at Toronto, where various sizes of pipe have been produced by this method for several years.

The installation of the De Lavaud machines by the United States Cast Iron Pipe & Foundry Co. is the first to be made in the United States although, apart from Canada, the process has been in use in Brazil, where it originated, as well as in the Argentine and France for a number of years. Stanton Iron Works of England obtained the rights for the use of this process in Great Britain a year or two ago.

In the early period of the demonstrations of the De Lavaud process in the United States, THE IRON AGE published the first description in its issue of Sept. 7, 1916, and later articles appeared covering the development of the process in Canada and South America.

Dominion Government Pays \$3,000,000

The Dominion Government has overridden the Auditor-General and has paid \$3,000,000 to the Dominion Steel Corporation, in connection with the company's claims for damages for the cancellation of the contract given to the plate mill at Sydney, N. S. Before the recent election, the company, which had entered an action in the Exchequer Court by consent of the Government, offered to settle for \$4,600,000, without proceeding to trial, its claim for \$6,800,000. The Government undertook to pay \$3,000,000 of this and an order-in-council authorizing payment was passed before the election. It was held up by the Auditor-General on the ground that the case was *subjudice*, and also that there was no appropriation from which it could be paid. The Treasury Board, which is a sub-committee of the Cabinet, overruled the Auditor-General a few days ago, and the company has received its cheque, the sum being charged to demobilization. While paying \$3,000,000, the Conservative Government leaves to its successor to say whether or not the balance of \$1,600,000 should be paid.

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The Rate Case in Steel

The iron and steel producers of the country have put before the Interstate Commerce Commission their reasons for asking that the industry be relieved of the heavy handicap of the 40 per cent increase in freight rates that went into effect in August, 1920. The commission was left in no doubt as to the distress in which iron and steel companies have been floundering for many months. Moreover, there can be no suggestion that in a natural desire to make their case strong the iron and steel companies have exaggerated their losses. The figures in respect to important companies are as public as those of railroad earnings, and every new financial statement concerning a steel company differs from its predecessors only in showing that as time passes the losses are greater. The annual meeting of an Ohio company this week showed that on an output of 203,000 tons of steel in 1921 the loss was nearly \$4,000,000, which figures out roundly \$20 to the ton.

In contrast, current railroad profits, approaching 4 per cent on appraised property values, are enviable, and the contrast in the two industries is further emphasized in their outlook. As Chairman Topping put it in his statement at Washington on Saturday, "With railroad operating cost steadily tending downward (November reports show a reduction of 25 per cent), the earning prospects of the railroads are at least encouraging, whereas the iron and steel outlook is the most discouraging that ever confronted us, not only because of the subnormal demand and prices which now obtain, but because of the impracticability of effecting further cost reductions without railroad co-operation." The process of railroad cost reduction, on the other hand, is but well begun. The changes in shop rules made by the Railroad Labor Board in December will produce savings that have been put at \$80,000,000 per year. And now a decision of the same board, effective Feb. 1, establishing new rules for clerks, freight handlers and station agents will add economies computed at \$50,000,000 per year "under normal traffic conditions."

There will be differences of opinion as to the extent to which the reductions in freight rates asked by the iron and steel industry will increase

the demand for steel. On that score large claims were made by those who appeared before the Interstate Commerce Commission in the hearings of the past week. So complicated is the present situation and so uneven is the adjustment from war conditions in manufacture and merchandising, that the appraisal of effects likely to follow from any single change is exceedingly difficult. It would have been said in advance that so great a drop in cereal and food-product values as has taken place would go far in facilitating readjustments in other values. Distress in any industry is not a good foundation on which to build prosperity in any other. And it is certain that the distress of the farmer is contributing in no small measure to continuing distress in iron and steel manufacture.

The argument made at Washington in behalf of lower iron and steel freight schedules, particularly on raw materials, is certainly not that the railroads should be brought to a state of distress because the steel industry has long been in that state. The argument is that railroad rates, and particularly railroad wages, should not remain on a war basis at the expense of every other industry in the country. Iron and steel manufacturers have a claim which can be urged by no other class of shippers, for there is no parallel in other industries for the hauling, often for long distances, of five tons of raw materials for the making of one ton of finished steel product. Thus on no other class or classes of freight have the railroads any such prospect of participating in the benefits of the increased activity that would be produced by lowering the transportation charge.

In no opinion is there such agreement in the whole business world as in the opinion that freight rate reductions are essential to further progress in the readjustment of prices. Whether these freight reductions are the cause or the effect of reductions in excessive railroad wages is not so important as that they be brought about. The steel industry has been in no haste in arriving at the conclusion which was urged at Washington with such impressive marshaling of the facts. But there has never been greater unanimity throughout the length and breadth of the industry than in the opinion now held that no real turn for the better can be ex-

pected unless a reasonable reduction is made in the charge for transporting its raw materials and its finished products.

Price Basing Points

For several months bars, shapes and plates have sold in Chicago territory at prices which were not the market price at Pittsburgh plus the freight from Pittsburgh to the point of delivery. In other words, the Chicago market in these commodities has not been governed by "Pittsburgh plus." In the past few weeks THE IRON AGE has been quoting the Pittsburgh market on bars, shapes and plates at 1.50c. and the Chicago market at 1.60c. The freight between Pittsburgh and Chicago is 38c. per 100 lb. Sales by Buffalo and various Pennsylvania mills have been made also without definite regard to Pittsburgh basing.

These departures from long standing custom have created scarcely a ripple in a market which has been subject to much vicissitude, though there might have been disturbance had the departures occurred in a strong market. When this matter of "Pittsburgh plus" was first brought to general attention by criticisms of certain western consumers of steel it was argued that abandonment of the system would greatly increase the competition between mills. The argument was perhaps applicable to certain conditions, but the fact should be noted that it is not applicable to present conditions. Abandonment by the Chicago market of the Pittsburgh basis has lessened the number of competitors in that field. Many mills have simply withdrawn from the competition.

Chicago, as already stated, is only one case of departure from Pittsburgh basing. One of particular interest was reported in THE IRON AGE last week, an informal arrangement having been proposed between certain wire mills and their customers in the Cleveland district, whereby wire prices at Cleveland would be higher than prices at Pittsburgh by approximately one-half the freight from Pittsburgh to Cleveland. The arrangement would be much the same as if Cleveland were put on an f.o.b. Youngstown basis.

It is well understood in the trade that while the complaint against "Pittsburgh plus" now being prosecuted by the Federal Trade Commission is directed against the United States Steel Corporation, it was not the Steel Corporation that originated the system, which was more or less common in the steel market for years before the corporation was formed on April 1, 1901. It was not universal before that date, nor has it been universal since. For many years rails have been at the same price f.o.b. mill wherever located, with the exception of Colorado. There was an earlier period, however, when the rail market was regularly \$2 a ton higher at Chicago than at Pittsburgh. An interesting point in that connection is that while it is claimed Pittsburgh is the natural basing point on account of its heavy production, a little over 30 years ago the Chicago district was making more rails than the Pittsburgh district, yet Chicago had the higher price. In wire nails it used to be a common thing for the Chicago market to be at what was called an "arbi-

trary" over the Pittsburgh market, the "arbitrary" being usually 10c. a keg, regardless of the freight rate.

It would be difficult to argue that the existence or non-existence of the "Pittsburgh plus" system of quoting delivered steel prices encourages or retards advances or declines in prices, and it would be quite impossible to prove the case for any one of the various alternatives. The markets would simply be more sensitive, the greater the number of basing points, for the greater the mass the greater the inertia.

Pig iron has shown that it is possible, without injurious disturbance, to have a number of basing points, and also that it is impossible for the differentials between districts to vary widely. Except during the period of Government control of prices in connection with the war there have always been almost as many pig iron markets as producing districts, and prices rose and fell much the same in all the districts. These districts were separated by twilight zones, and when the market in one district advanced or declined the twilight zone would shift, inducing a change in the adjoining district.

American Steel and World Supply

A new low record for recent years in iron and steel output was made in 1921 in the sum total of the five leading countries. All were caught in the reaction from the false prosperity of 1919 and 1920. Germany and France were able to come close to their production of the preceding year. But for the world-wide depression, both probably would have shown a measurable gain. More reliable comparisons are possible than at this time last year, data as to Belgium and Germany not being available then. The 1919 and 1920 figures for Germany are based on information recently secured by our Berlin correspondent, the first that has been made public there since October, 1919, when the printing of monthly production figures was stopped. For the United States and Great Britain the figures given below are close estimates for 1921 and official for other years, while those for France are based on nine months' data statistics for last year and those for Belgium on 10 months' returns. For other years official data are given, corrected to date. Comparisons are made with 1920, 1919 and 1913:

Output of Pig Iron and Steel (Including Castings) in Five Countries, Gross Tons

	1921*	1920	1919	1913
Pig Iron				
United States.	16,750,000	36,925,900	31,015,300	30,972,000
Great Britain.	2,611,400	8,007,900	7,398,000	10,260,000
Germany . . .	5,750,000	5,550,000	5,654,000	16,765,000
France	3,294,000†	3,880,400	2,376,000	5,124,000
Belgium	875,600†	1,112,000	247,200	2,445,600
Total	29,281,000	54,976,200	46,690,500	65,566,600
Steel				
United States.	20,250,000	42,132,900	34,671,200	31,300,800
Great Britain.	3,624,800	9,056,800	7,894,000	7,668,000
Germany	7,750,000	7,710,000	6,732,000	17,340,000
France	2,913,600†	3,002,400	2,148,000	4,620,000
Belgium	804,000†	1,215,600	328,800	3,427,600
Total	35,342,400	63,117,700	51,774,000	63,356,400

*Partly estimated.

†For France based on nine months and for Belgium on 10 months' output.

The countries named probably produced about 90 per cent of the world's steel in 1921. In these columns a year ago a comparison of the 1920 output

with 1919 and 1913 showed the commanding position of the United States, which was credited with about 67 per cent of the total production of both pig iron and steel. Last year the American percentage fell to about 57, a proportion by no means small in the light of a shrinkage of over 50 per cent from the domestic output of 1920. Comparisons as to Great Britain must be made in the light of the coal strike which for three months seriously crippled that country's steel industry. Belgium in 1921 by no means kept up the rate of recovery indicated in 1920.

Total pig iron output in 1921 was only 53 per cent of that for 1920 and 45 per cent of the 1913 total, while steel production in 1921 was only 56 per cent of that for 1920 as well as of that for 1913. Between the pig iron output and that of steel in the five countries last year the difference is about 6,000,000 tons, steel being over 20 per cent greater. In 1920 the margin of over 8,000,000 tons was less than 15 per cent. In 1913, the pig iron total at 65,500,000 tons was more than 2,000,000 tons greater than that of steel. The present day preponderance of steel indicates the growth of the basic open-hearth steel industry with its large use of scrap, and corresponding conservation of the world's iron ore supply.

Railroad Improvements

The railroads have been getting to the point where they can consider the making of improvements as distinguished from extensions—a distinction not always made in popular discussions of the railroad position.

The railroads have not yet had a month of earnings at the rate contemplated by the Transportation act, but they have been making progress in that direction. In the first two months of 1921 there were deficits instead of earnings, but except for a possible retrogression in the last two months of the year the earnings have been progressively less unfavorable. The improvement is ascribed almost wholly to economy, rather than to increase in traffic. Measured by ton-miles of freight moved, traffic decreased in the first four months of the year, April being the low month, and then increased, so that August showed a heavier movement than January. September and October brought further increases, but it is understood the last two months of the year will show some decline.

In the first six months of 1921 the operating ratio of the Class I roads was about 88 per cent, while the next five months averaged about 76 per cent. That is a great improvement, but 76 per cent is still very high by comparison with pre-war ratios.

The general opinion is that railroad conditions are now moving in the right direction, so that the railroads are getting to the point of being able to spend some money beyond what is necessary merely for conducting transportation. Railroad borrowing power is increasing, both because railroad reports are improving and because the money market in general is becoming more favorable.

In some quarters the expression "railroad expenditures" suggests the laying of track and the buying of locomotives and freight cars. It is im-

probable that much of that sort of thing will be done. There are idle locomotives and freight cars and some of them are in bad order. The necessity for increasing the number is not pressing. As to track extensions, there may be some disposition to build short feeder lines, but certainly there will be little laying of strictly new railroad. In this connection the *Railway Age* mentions an interesting point, that already this year the Class I railroads have bought more passenger cars than they did in all of 1921—222 cars against 207. This is not to increase passenger carrying capacity, but to improve service.

A great many improvements are waiting to be made, falling in two general categories—improvements that will decrease the cost of operation and improvements that will increase the carrying capacity of the roads. All the improvements will cost money, and the desirability of their being made will be used continually by the railroads as an argument against reductions in freight rates. One particular improvement does not fall precisely in either of the categories mentioned, the introduction of automatic train stops. The Interstate Commerce Commission is now pressing this subject, and the attitude of the railroads no doubt will be that this would be chiefly a safety measure, although in the long run it would no doubt also both decrease cost of operation and increase capacity. First, the railroads will be called upon to make experiments which will cost money, and the money must be found long in advance of any economy that may ultimately result.

The Yale & Towne Manufacturing Co., Stamford, Conn., made this statement recently in explanation of the company's decision to build a plant in Germany:

Investigation has indicated that the cost of production in Germany is so much lower than in the United States that it is hopeless at this time to compete in many export markets with goods of American manufacture.

There are other evidences of like steps being taken on the strength of the belief that Germany is the cheapest producer, due to cheap labor and cheap money. American moving picture interests are taking advantage of this condition by an increasing use of films "made in Germany." That Germany is at work on a broad scale was given emphasis by the fact that her iron and steel exports late last year exceeded those of any other nation and recently her buying of American copper has been on an unprecedented scale.

Out of 22,409 tons of steel castings produced in Canada last year, 13,984 tons, or 62.4 per cent, was made in electric furnaces. And this was done in a year of depression when the country's total steel output fell to 56,000 tons per month from 92,000 tons per month in 1920. The best record in the production of electric steel castings in the United States was in 1920 when the castings made in electric furnaces were only 12.4 per cent of the total. And the United States leads the world in the use of the electric furnace. Electric power is cheap in Canada and the steel foundry industry is profiting thereby.

SCARCITY IN GERMANY

**Fuel Curtailment Restricts Pig Iron Production—
Exports Decrease—May Import
Newfoundland Ore
(Special Correspondence)**

BERLIN, GERMANY, Jan. 2.—The German iron and steel market is closely linked with the exchange question. Whether the recent increase in value of the mark represents a turn of the tide depends entirely upon this upward trends continuing for any length of time. The notable improvement in currency which began early in December has thus far directly affected only the scrap market, where prices for best grades have receded from the high point of 3300 m. to about 2100 m., the present quotation.

However, the tendency of the scrap market is no longer indicative of the trend in finished iron and steel, at least not to the extent that it was formerly. Scrap prices are now fluctuating with exchange rates. This may be explained by the fact that fairly large tonnages of old material are stored in France, Belgium, Holland and the United Kingdom, which naturally leads to larger offers to German buyers whenever German prices approach normal. A Dutch firm at Rotterdam has attempted to obtain rolled material from German mills for a British account, offering to exchange scrap stored at Le Havre, France. As a result of the improvement of the mark, German consumers of scrap have purchased stocks from England.

Aside from scrap, there is no distinct change in the tone of the market. The possibility of a readjustment of reparations has introduced an element of uncertainty and buyers are cautious in placing orders. While formerly the mills showed a marked reserve in closing deals, the consumer is now slow to engage in long-term transactions. The demand for lots for current delivery is still active and complaints of inadequate supplies by domestic consumers are as numerous as ever. This feature is more noteworthy when it is considered that export business has lately shown a decrease in volume. With the decline in world's market prices, the increase in value of German currency, the 4 per cent export levy, and the risks incident to the uncertain future of the mark, there is very little inclination among producers to compete in international markets, the more so as a revival in building is expected in the spring. Belgian competition in rails is considered as serious.

Fuel Supplies Curtailed

The coal shortage has led to a cutting of the self-consumption fuel quota for smelting plants. The reduction in supplies amounts to 150,000 tons (100,000 tons of coke and 50,000 tons of coal), and came into operation in January. A feature of the ore market is the offering of Wabana ores by British interests closely connected with the Wabana ore mines in Newfoundland. This ore has been considered as a substitute for Swedish ores provided an agreement is reached on price. The high content of silica is also a deterrent.

Demand for pig iron continues strong and because of the coke shortage can not be met by the furnaces, so that the importation of Czecho-Slovakian pig iron is under consideration. Among recent price advances are Siegerland steel-making iron and 8 to 10 per cent spiegeleisen which have been fixed by the pig iron syndicate at 2964 m. and 3067 m. per ton.

The existence of the pig iron syndicate has been prolonged for five years more and the participation quota system thoroughly revised. The quota for each works heretofore was, with few exceptions, fixed about 10 years ago, and in view of the important changes during and since the war, no longer corresponds to their producing capacities. The new agreement provides that the production figures for each works during a period of six months (minus the tonnage for self-consumption) shall constitute the participation quota for the successive three months. The

possibility of an unlimited development of participation quotas is restricted by a provision retaining the former quotas as maximum figures.

Semi-finished Material Scarce

Semi-finished material is scarcer than pig iron. Mills depending upon outside sources for their supplies are finding it extremely difficult to cover their most urgent requirements. Some grades, such as sheet bars, have almost disappeared from the market and blooms are also difficult to obtain. Many mills are now using ingots for rolling light sheets.

Interest in finished material is chiefly centered on bars and structural shapes. Rail requirements are known to be enormous, but business is restricted because of the financial difficulties of the railroads. Several mills have already granted credits to private railroads. Activity also prevails in the wire market where mills are booked for at least three months ahead. It is safe to assume that 40 per cent of the present output is for export. Drawn wire for export is quoted at £10 to £12, which is but little above the domestic level. The loss in production caused by the recent strike at the Düsseldorf works is severely felt in the tube market. Most of the mills have orders booked into the second quarter of 1922. The tone of the sheet market is easier on the heavier gages, which are more readily obtainable, but supplies of medium and light gages continue scarce.

Prices during the past fortnight do not exhibit any noteworthy changes. The tone of the closing week of the year 1921 was quiet but firm. We quote as follows, per metric ton, unless otherwise stated:

	Marks Per Metric Ton
Bar iron.....	6,800
Structural shapes.....	6,900
Tees and channels.....	6,500
Plats.....	6,600
Rounds.....	6,550
Squares.....	6,500
Angles.....	8,200
Sheets, heavy.....	6,300
Sheets, medium.....	8,400
Plates, light.....	11,600
Seamless steel tubing, 1 in., per meter.....	19

LAST TWENTY PER CENT

President Clarke Speaks on Importance of Exports to Industries

PITTSBURGH, Jan. 24.—E. A. S. Clarke, president Consolidated Steel Corporation, New York, and Governor H. J. Allen, Kansas, were the principal speakers at the annual banquet of the Engineers Society of Western Pennsylvania at the William Penn Hotel here last evening. Mr. Clarke's subject was "Foreign Trade and Its Relation to This Country." He said that no business was profitable if any substantial element of its production remained unsold. In every line of production, there is an element roughly estimated as the last 20 per cent, the sale of which is essential to the profit of the whole operation. Cost of material and expense of operation come first and it is what is left that makes the profit. Foreign trade of the United States now is in the position of that "last 20 per cent" in relation to our industry as a whole. Mr. Clarke drew attention to the steady growth in exports of manufactures, noting that they have grown from 14.8 per cent of the total in 1880 to 47.2 per cent in 1914, while in the same period exports of raw materials and food-stuffs had dropped from 84.8 per cent of the whole to 52.5 per cent of the total. He reviewed at some length the assistance rendered by the Government through the Department of Commerce, and also told of the help which had come through the War Finance Corporation and the Webb-Pomerene law.

Governor Allen's talk was chiefly about the industrial relations court of Kansas, telling how successful this has been in the adjudication of labor disputes in Kansas. George S. Davison, president Basic Products Co., Pittsburgh, was toastmaster.

Iron and Steel Interests Ask Reductions

Exhaustive Hearing by Interstate Commerce Commission— Witnesses Hold High Freight Rates Responsible for Business Depression

BY L. W. MOFFETT

WASHINGTON, Jan. 24—Unprecedented in its exhaustive detail, iron and steel, foundry, and coal and coke interests representing every important producing section of the country, have completed their testimony before the Interstate Commerce Commission in behalf of substantial reductions in freight rates. Submitted in connection with the commission's general rate investigation, the testimony was begun last Thursday with the opening of the shippers' side in this proceeding, and was concluded yesterday. The first and second days were devoted exclusively to coal and coke rates while the third and fourth days were given over to rates on raw material used in the manufacture of iron and steel, which necessarily included coal and coke, as well as ore and limestone. Testimony was also submitted as to refractories, pig iron and semi-finished and finished steel.

Sitting for the commission were Commissioners Hall (presiding), Lewis, Aitchison and Esch.

Whatever may be the outcome of the investigation, scheduled to close on Feb. 25, it is certain that the iron, steel, foundry, and coal and coke people presented a carefully prepared and voluminous case abounding in facts and figures that could hardly be exceeded for intelligent study. That both the commission and the railroads were impressed is evident. This is not to say that the railroads were swayed from their repeated claims that their financial condition does not warrant general reductions in freight rates; nor is it to say the commissioners were moved to that conviction. But it is a certainty that the facts presented pictured to them most vividly the depressed condition in the iron and steel industries, whose representatives are firmly of the opinion that lower freight rates would stimulate activity for them and be of benefit to every interest in the country, including the carriers. The hope is entertained that the proceedings will result in relief through lower freight rates and some are confidently expectant to this end, with a difference of opinion as to whether it will be through general reductions on all lines or cuts of some character in rates on raw products.

Appeal for Old Rates

Broadly, the iron and steel industry wants the Commission to restore rates prevailing before the so-called 40 per cent general advance which was effective Aug. 26, 1920, in ex parte 74. This was urged by Chairman John A. Topping, of the Republic Iron & Steel Co., as spokesman for the majority of the independent steel makers and by such a prominent United States Steel Corporation representative as L. C. Bihler, traffic manager for the Carnegie Steel Co. F. A. Ogden, general freight agent for the Jones & Laughlin Steel Co., appeared for the same interests as Mr. Topping and supplemented testimony of the latter, making a similar plea as to rate reductions. Their requests related to raw products, pig iron, and semi-finished and finished steel. Iron and steel producers, coal, coke, pig iron and steel and foundry interests, all pointed out that their industries not only have been liquidated but are producing at a loss.

The attitudes of bituminous coal producers were expressed by the first witness for the shippers, J. D. A. Morrow, vice-president of the National Coal Association, who requested a heavy cut in coal rates, and suggested that a reduction of 75c. a ton by April 1, "in all probability would be fully compensated for by the lower fuel costs of the carriers alone, to say

nothing of any other reductions in railroad operating expenses."

The position of the iron and steel makers in the Chicago district as a group, was explained through Robert Hula, assistant traffic manager of the Steel & Tube Co. of America, who urged "maximum relief in rates on coal, if in the judgment of the commission reductions can be made under existing circumstances."

His request for an early decision in order to remove the prevailing uncertainty in the commercial world due partly to the railroad situation, and his assurance that the interests for which he spoke do not want to destroy the transportation system expressed the strain running through most of the testimony. The point was repeatedly made, however, that lower rates would increase both the volume of traffic and net revenues for the railroad.

H. D. Langhorne, speaking for the Virginia Pig Iron Association, in urging reductions in rates on basic commodities, including furnace materials and pig iron, said such action would stimulate the movement of commodities and increase the operating revenues of the railroads. W. A. Barrows, Jr., speaking for the Eastern Pig Iron Manufacturers, said that iron and steel consumers of all classes are waiting for lower freight rates before making any available purchases and urged reductions in rates upon the percentage basis.

Bearing a Great Burden

J. Fred Townsend, traffic manager for the National Tube Co., submitted elaborate tables showing the large increases in rates both inbound and outbound to indicate the heavy burden the steel industry is bearing. When he had finished Commissioner Hall suggested that other witnesses might as well omit declarations and exhibits of that kind because it was obvious that the cumulative effect of the 5, 15, 25, and 40 per cent advances made since 1913, was an increase of a little more than 110 per cent. Figures of that kind, Mr. Hall said, show no more than that the steel industry has suffered in the same way as all other payers of freight rates.

"But the increase on inbound raw materials has been more than 110 per cent," said Mr. Townsend. "On coal it was 150 per cent."

"But that includes increases on intrastate rates," observed Mr. Hall.

Mr. Townsend said that it took eight carloads of raw material to produce one carload of wrought pipe. The increase in the freight bill of the National Tube Co. on inbound material was from \$5,554,820 in 1913 to \$11,316,534 in 1921. On outbound the increase was from \$9,470,652 to \$19,378,455. The increase in the car mile was 112 per cent.

"Was your labor cost in 1920 greater than your total revenue in 1916?" asked Mr. Hall.

"Are you asking about labor cost on railroads?" inquired Charles S. Belsterling, commerce attorney for the United States Steel Corporation, who was conducting the examination of the witness. Mr. Hall said that what he had embodied in his question was the fact with regard to the railroads.

"I'm not prepared to answer that," said the witness.

Speaking not merely for the National Tube Co. but for all engaged in the manufacture of wrought pipe, Mr. Townsend asked for a new set of minimum weights on this. At present its minimum is 40,000 lb., but the average loading is in the neighborhood of

88,000 lb. The industry desired, he said, a minimum of 24,000 lb. at fifth class, 60,000 at sixth, with l.c.l. shipments moving at fourth class. He said that there are a number of articles rated at fifth class that have minima as low as 24,000, hence the suggestion that wrought pipe have a carload rating as low as that. He said that it would give the comparatively small dealer a chance to order in quantities he could handle.

The witness said that the domestic rates on wrought pipe were too high for present conditions, especially to the Pacific coast, where foreign competition has wholly displaced American pipe. The rate figures out \$33.30 per ton. A reduction of 50 per cent, he said, with the average loading would still yield a revenue of \$669.81 per car, or 24c. per car-mile. Foreign pipe, he said, is coming from Germany at \$5.60 per gross ton from Hamburg and \$4.80 from Antwerp. A rate as low as \$8 a ton, he said, had been made recently on other commodities, such as building sand in ships coming from foreign ports to Pacific ports to load with lumber and grain.

Buffalo Causes a Stir

The hearing was enlivened Monday during the examination of James P. Daly, traffic manager of the Donner Steel Co., who appeared on behalf of Buffalo district iron and steel interests, during which he repeated requests made previously by these producers for readjustment of rates on coal and coke to their plants and opposed reduction in rates on iron ore from lower Lake Erie ports to interior furnaces.

Attorney Francis B. James was conducting the examination, when objection was raised to all of the testimony by Attorney Charles S. Belsterling on the ground that the complaints made by Mr. Daly are before the commission or are to come before it in other cases.

Mr. James said the statement of Mr. Daly was intended as an answer to the demands of other iron and steel interests for reductions in ore rates.

Commissioner Hall advised Mr. Belsterling that his objection had been noted, but the testimony would not be struck out for the present. He said, however, that it covered only local matters in a general hearing and could be disposed of under complaints filed.

Mr. Daly, asked by Commissioner Lewis what specific commodities should be reduced in the event no general reductions were made, replied that no single commodities should be selected arbitrarily, but pointed out that if it is found on a sound basis that such action is justified, the first reduction should be made on coal. He assigned as his reason the fact that coal is used in practically all industries and a reduction in rates on this commodity would tend toward the liquidation and stimulation of industries of the country generally. He advocated cuts in ore rates as they relate to the rail movement from the mines to the upper docks, stating that this would benefit all furnace interests, while a cut on ore from lower lake ports would give no benefits to lake front furnaces and stating at the same time that ore rates from lower lake ports now are relatively low.

Cause of Present Depression

"The rates on raw materials entering into the manufacture of iron and steel are much too high and must be reduced," said J. M. Gross, general traffic manager for the Bethlehem Steel Co. "There are yet to be effected many readjustments in the rates on furnace materials and these adjustments should be made before or simultaneously with any general reductions. That the present level of freight rates on raw materials is, to a large extent, responsible for the present conditions in the steel industry is frequently alleged and it is believed can be easily demonstrated. Most industries ship approximately one ton of products for every ton of raw materials. Thus the burden of a horizontal increase in freight charges in the case of such products in proportion to selling price amounts to far less than in the case of a ton of steel. The successive horizontal increases, therefore, have resulted in increases in total freight charges with respect to each ton of steel prod-

ucts which are far out of line with the increases per ton of practically every other commodity and industrial product. These increases in freight charges, of course, are reflected in prices for steel which are entirely out of line with prices for other commodities judged on a pre-war basis."

Charts Submitted

J. L. Roney, general traffic manager for the American Rolling Mill Co., Middletown, Ohio, on Monday, submitted charts in support of the proposal that the 40 per cent advance in the Eastern district should now be eliminated. In addition to that he emphasized the desirability of export rates on iron and steel so as to enable the American mills at all times to market their surplus. Thereby, he said, continuous and economical operation would be assured and labor would always be employed in the mills. He urged the commission to see to it that export rates were always so adjusted.

"Would you rather have a small reduction in rates or an assurance of service?" asked Commissioner Lewis.

"We have service now but no business," answered the witness. "Give us the rate reduction and we'll get the business. If we have the business, we are willing to take chances on obtaining service."

Admitting, in answer to Commissioner Hall's questions that the depression in business is world-wide, Mr. Roney contended that a reduction in rates in the United States would have the effect of improving business.

A. S. Lucas, chairman of the Birmingham District Traffic Managers' Association, spoke Monday afternoon particularly for producers of cast iron pipe and fittings, and said that the present rates are restricting the use of pipe by municipalities because the appropriations they have for installing water pipe are insufficient to pay for the required tonnage and freight rates. He said, as an instance, that Phoenix, Ariz., needed 6000 tons of pipe, but on finding it would cost \$60 per ton, delivered, was able to take only half that amount. Answering questions, Mr. Lucas said he would remove the whole of ex parte 74 "as a starter" and then make other readjustments.

American Foundrymen's Association

Testimony in behalf of the American Foundrymen's Association was given Monday afternoon by its president, W. R. Bean, who asked for the removal of railroad rate increases on inbound shipments of pig iron and outbound shipments of castings of all kinds made in ex parte 74. He told the commission that the association has a membership of 1600 foundry organizations which are of the firm conviction that the increase in the volume of business which will result in the near future from the reductions suggested will place the carriers in a better financial position than will be the case if present rates are maintained.

American Pig Iron Association

Appearing for the American Pig Iron Association, which represents merchant blast furnace interests in the various producing sections of the country, Richard Peters, Jr., urged that the commission restore rates on both inbound raw materials and on outgoing pig iron shipments such as prevailed prior to the general advance of rates on Aug. 26, 1920. His statement was comparatively brief inasmuch as pig iron associations from different groups had already set forth the condition existing in the iron industry, which is charged partly to high freight rates, and he treated the question in a general and broad way. He stated that the high freight rates have localized distribution of pig iron and destroyed the economic system on which the pig iron industry was created. Producers are losing established trade, he said, and it will be difficult to re-establish it. Likewise, he pointed out, consumers find it a financial burden to get the particular mixtures of iron they require which are produced in the different sections of the country according to the requirements.

Lake Superior Iron Ore Association

One exhibit was submitted to the commission Monday afternoon by L. C. Sprague of M. A. Hanna & Co., testifying for the Lake Superior Iron Ore Association,

to show that the rates on iron ore from the mines to upper lake ports are too high and should be reduced. Unsuccessful efforts were made to have the statement of Mr. Sprague struck from the record, but he pointed out that the facts were taken from the records of the Interstate Commerce Commission and not, as charged, from those included in the Adriatic Mining Co. case. He said the purpose of the statement was to show that the advance in rates on iron ore was greater than on other commodities, and that the advance put on the rates from the mines to the docks was intended to cover the increased cost of transportation both in the upper lake region and also from the lower lake ports to furnace points.

Maladjustments Cited

S. L. Meyer, in behalf of the Hammond Iron Works, Warren, Pa., said Monday afternoon that instead of ordering general reductions in rates, the commission would confer a greater benefit on the whole country by removing the present maladjustments and thus enable manufacturers such as the Hammond Iron Works to get back some of the business lost by reason of the increase in the spread of rates from the same point of origin to the manufacturing plants of different fabri-

cators and manufacturers. He said he had in mind the fact that prior to the percentage advances there was a difference in rates to the fabricating plants of the Hammond company and its competitors of 10c. per 100 lb. on steel plates used in fabricating tanks. At present the difference is 16.5c. Under the old adjustment, the complaining producer could absorb the difference in rates and compete on terms that permitted it to obtain a fair share of the business. At present, he said, instead of 20 per cent of the business in the big continent oil fields, the company has only 2 per cent. He said that formal complaint is soon to be filed by the Hammond Iron Works against the existing differentials.

"I do not believe that the Interstate Commerce Commission, under present conditions, could order reductions sufficient to help business without bankrupting the carriers," said H. C. Lust, who also appeared for the Hammond Iron Works. "A 10 per cent reduction would not, I believe, originate an additional pound of steel traffic for the railroads, or an additional ton of coal for them. My idea is that it should devote its attention to ironing out the maladjustments so as to enable all to go back into the markets in which they competed prior to the percentage advances."

Freight Rates Double Those of 1913; Steel Prices Up One-Fourth

Chairman John A. Topping of the Republic Iron & Steel Co., who appeared in behalf of a number of independent manufacturers of iron and steel, stressed the great disproportion between the advance in freight rates since 1913 and the percentage by which existing prices of finished steel exceed the average of steel prices in 1913. The transportation advance is substantially 100 per cent while that of steel is only one-fourth as much. The following is taken from Mr. Topping's statement:

"The independent group of steel manufacturers represent approximately 55 per cent of the steel ingot capacity of the United States, and have an invested capital of approximately \$3,000,000,000. Under normal conditions they employ about 350,000 men, with payroll, based on normal employment at present wages, of approximately \$400,000,000 per annum. Their productive capacity is about 28,000,000 tons of ingots per annum. This capacity, when fully employed, suggests a traffic volume to the railroads of about 168,000,000 tons per annum.

"This large group of iron and steel producers, known as the independents, to distinguish them from the United States Steel Corporation, owns no railroads except such as are required as a plant facility for terminal use, or for connecting railroad purposes, and they are therefore entirely dependent upon the carriers for transportation. It may also be stated that normal railroad traffic depends, to a larger extent upon the prosperity and general activity of this great group of manufacturers than on almost any other interest, because the iron and steel manufacturer furnishes the railroads with six tons of traffic for every one ton of manufactured finished product. That is to say, for every ton of outbound movement five tons of inbound raw material are required for its production; consequently, railroad prosperity greatly depends upon maintaining such conditions for manufacture as will make for fair prices, and unless this is done neither normal demand for iron and steel nor a maximum volume of traffic can be maintained.

The Great Decline in Steel

"Iron and steel prices have fallen out of all proportion to the reduction in cost; consequently, *cost of production for iron and steel must be further reduced, or the selling price of iron and steel must be increased*, a contingency which, if forced, might be disastrous to both the carriers and producing interests.

"The decline in iron and steel prices was emphasized and liquidation hastened by an almost complete col-

lapse in demand. Prices during the year 1921 declined over 50 per cent, while demand at the low point did not exceed 20 per cent. In fact, the iron and steel trade is suffering the worst depression in its history, as average production for 1921 did not exceed 40 per cent, whereas, following the panic of 1907, production was at 70 per cent and after the panic of 1893 averaged about 85 per cent.

"As a consequence of these adverse conditions during 1921, profits were quickly eliminated and losses substituted, while current operations are no less discouraging; in fact, losses became so pronounced that cost reductions were mandatory, and wage reductions of about 46 per cent followed. This reduction, taken in connection with other economies, resulted in cost reductions of about 35 per cent, while iron and steel selling prices, as previously stated, declined about 50 per cent, which decline compares favorably with the unprecedented average decline in farm products of about 56 per cent.

Unfairness of Existing Freight

"We believe that where freight rates bear so large a percentage to the commodity value as freight rates now do to iron and steel costs, freight reductions are essential to a normal consumption of these commodities; in other words, with freight charges representing 50 per cent or more of iron and steel values, normal consumption and movement of these commodities is impossible. Not to emphasize the claims of any particular district, but for purposes of illustration, permit me to point out that on coal, which costs our company about \$2.25 per ton to mine, and is shipped over the B. & L. E. and B. & O. railroads, a distance of 81½ miles, the freight charge is \$1.50 per ton; consequently transportation represents about 75 per cent of the coal cost. On iron ore, where the mine cost runs from \$1 to \$2 per ton, varying with the character of the mine operation, the freight charge, based on an average movement from the Mesabi range of about 77 miles, is \$1 per ton, or approximately 66 2/3 per cent of the average cost of ore. The lower lake rate on ore is no less excessive, as the rate on iron ore for direct shipment from Cleveland to Youngstown, a distance of about 67 miles, is 99¼c. per ton. This rate the carriers voluntarily reduced to 74c per ton, effective during the last quarter of 1921, but permission to continue this rate after December, 1920, was denied the carriers, presumably because of this general investigation.

"THE IRON AGE, in commenting upon the relation-

ship of iron and steel prices to freight rates, stated that whereas freight rates have doubled since 1913, the price of seven items of iron and steel, including rails, at Dec. 1, 1921, was \$.0209 per lb., as compared with the 1913 average price of \$.0166 per lb., or an increase of \$.0043 per lb., the equivalent of an increase of 26 per cent, or only one-fourth the percentage of increase made in freight rates.

"Julius Kruttschnitt, chairman of the executive committee of the Southern Pacific Railroad, recently stated that 'freight rates on all railroads declined about 1 per cent between the years 1900 and 1917, and that the total freight rate increase to date was about 74 per cent.' It was also stated by Howard Elliott, chairman of the Northern Pacific Railroad, before this commission, that 'there was practically no inflation in the transportation business during the war.' These statements are not correct so far as they relate to freight rates on coal, coke, limestone, iron ore, iron and steel products, as may be easily ascertained by reference to freight tariffs issued for the Youngstown territory on iron and steel products for the years 1900 to 1917. From these it will be observed that freight rates increased from 3 per cent to 40 per cent, and that the total average increase from 1900 to 1921 on inbound freight was about 90 per cent. For the Birmingham district the increase on inbound raw materials was over 300 per cent. On the other hand, outbound freights on iron and steel in the central traffic territory from 1900 to 1917 increased to principal points about 80 per cent, and from 1900 to 1921 from 122 per cent to 160 per cent.

Burden on Steel Disproportionate

"It may be assumed, perhaps, that the claims made by the gentlemen mentioned had reference to the average of all freight rates being substantially unchanged during the period referred to. But even so, only one conclusion can be reached, viz., that iron and steel products and raw commodities required in their manufacture have carried a disproportionate share of the transportation burden, as compared with other commodities; and, therefore, the unfairness of the increase made on iron and steel commodities under *ex parte* 74 is emphasized. Then again, inasmuch as railroad maintenance of way and equipment represents nearly 20 per cent of the cost for conducting transportation, and as iron and steel enters largely into this item of railroad cost, is it not manifestly to the advantage of the railroads to bring about, in their own interest, lower costs for iron and steel?

"The problem is, can the cost for conducting transportation be reduced sufficiently to put into effect freight rates on bulk commodities like coal, iron ore, iron and steel, sufficiently low to insure a normal movement? The answer is—Yes, and it should be done. The problem is largely a labor question, for labor is the big item of cost, as it represents about 60 per cent of the cost of conducting transportation, and yet this item of cost has hardly been touched, the reduction effected amounting to only about 12 per cent, whereas the wages of most other labor (outside of that employed in transportation) have been reduced by 30 per cent to 50 per cent. It is therefore clear that the Railroad Labor Board should not oppose but recommend that the railroad executives should make further wage reductions and adjustments in keeping with competitive rates for labor, otherwise you are exempting railroad labor from the economic consequences of the war by maintaining war wage rates in times of peace, in the face of reductions in the cost of living variously estimated by the Bureau of Labor Statistics at 22 per cent to 37 per cent, depending upon the locality. . . ."

[Mr. Topping again brought out the point developed in his statement before Examiner Howard Hosmer in the iron ore rate hearing at Chicago, Dec. 7, showing how the steel industry had been extended into many new districts because of the growth of the open-hearth process. Thus markets once supplied by the older steel-making districts are no longer open to them. Output of some plants, particularly those solely dependent upon rail transportation, has been curtailed, cheaper

water transportation having helped some of the newer districts.]

Lower Freights Will Increase Steel Consumption

"We are of the opinion that fair readjustments of freight rates will gradually restore normal conditions of demand for iron and steel, and bring about normal traffic conditions. While production has increased during the past twenty years about 320 per cent, and present steel ingot capacity is over 50,000,000 tons, yet the normal consumptive requirements of the country have also grown; in other words, the per capita consumption of steel has increased from 300 lb. in 1900 to 834 lb. in 1920, or about 178 per cent, while the population of the country increased nearly 60 per cent, whereas during this period our exports increased over 300 per cent.

"Normal activity in iron and steel industry, as a whole, means a total traffic volume to the railroads of about 300,000,000 tons per annum, this tonnage representing about 15 per cent of the total annual business of the carriers. Estimating present capacity employed at not to exceed 40 per cent, the present volume of iron and steel traffic does not exceed 120,000,000 tons per annum; but, if the iron and steel business can be brought back to normal, the railroads would benefit to the extent of an increase in traffic of 180,000,000 tons per annum, and this increased traffic volume might more than offset revenue losses through reductions in the commodity rates suggested, because the increased traffic promised consists of the most profitable business handled by the carriers.

Where War Profits of Steel Companies Went

"From the testimony submitted to your commission by Howard Elliott, chairman of the Northern Pacific Railroad Co., it would appear that he, at least, is under the impression that the accumulated 'war profits' of the manufacturing companies were such that the existing freight burdens can be carried indefinitely without hardship.

"No greater mistake could be made by the railroad executives or by others in authority, than to act upon any such assumption, because the average steel earnings during the past six years have not been excessive. I base this statement upon the average earnings realized by three large steel companies during the last six years, after deductions for taxes, depreciation and inventory shrinkage. The net profits of these companies have averaged about 9½ per cent on the combined capital and surplus. If the percentage of profits is calculated upon a fair appraisal value of these properties the rate would be considerably reduced. When the hazards and uncertainties of steel operations are considered, particularly taking into account the necessity for making large expenditures to keep pace with changes and improvements in steel-making processes, the above earnings cannot be considered excessive during the six most prosperous years of the steel trade.

"Large expenditures were also made out of earnings by most all of the steel companies during the war, for patriotic purposes, under conditions of cost which were not far from 300 per cent above normal. A substantial portion of this construction cost must be written off on war account, and the balance must be carried as excess producing capacity, which at present has no useful value. In fact, we feel that with our current losses running into substantial figures, the railroad situation is less desperate than ours, because temporarily, at least, we would be content with railroad current profits, which are about 4 per cent on the appraised property values. Then again, with railroad operating cost steadily tending downward (November reports showing a reduction of 25 per cent), the earning prospects of the railroads are at least encouraging, whereas the iron and steel outlook is the most discouraging that ever confronted us, not only because of the subnormal demand and prices which now maintain, but because of the impracticability of effecting further cost reductions without railroad co-

operation. We must, however, make further reductions in cost or advance our prices, and to increase prices under existing conditions of business would, in our opinion, be exceedingly hazardous to the interests of both the carriers and ourselves.

"We therefore urgently recommend that reductions be made of a substantial character in the freight rates on iron and steel and their related commodities, not only because the rates now in existence are out of all proportion to the value of the products, but principally because existing rates of freight are not justified by the cost of the service, plus a fair railroad profit."

Lower Export Rates Stimulated Business

F. A. Ogden, general freight agent Jones & Laughlin Steel Co., Pittsburgh, also advocated the abolition of the ex parte 74 increase on iron and steel products. He argued that this 40 per cent advance was a factor in bringing about the slump in the steel business, as for eight months prior to the putting in effect of this advance the steel mills were doing a very large business. In 1921, part of the increase in shipments which developed in August and continued through the remaining months of the year was due to the granting of a reduction of 25 per cent in the export rate on iron and steel to Atlantic ports. September, October, November and December all showed increases in exports, the total of the four increases over the August rate being 144,753 tons. Counting six tons of raw material to a ton of steel, the speaker calculated that the lower export freight rate was responsible for the hauling of 144,753 tons more finished steel, and also the hauling of 868,518 tons additional raw materials. Mr. Ogden believed that if proper reductions were made in domestic rates there would be a like or greater increase in domestic shipments. The freight advances of 5, 15, 25 and 40 per cent put in effect since 1914 caused an

increase of 66 per cent on ore rates, 162.5 per cent on coal, 124 per cent on coke and 115 per cent on fluxing stone. The increase in freight costs of assembling raw material for a ton of metal is over \$5. The books of many of the steel companies will show losses for the year 1921. Such operations as the steel companies are maintaining are to hold at least a part of their organizations together, and to help in giving their employees work.

Eliminating the last 40 per cent advance in rates on the raw materials and finished products of the iron and steel industry was also urged by H. C. Crawford, Philadelphia, traffic manager of the Cambria Steel Co., Johnstown, Pa., in his testimony given Saturday. Asked by Commissioner Lewis if, in case it was found the general reductions requested could not be made by the commission, what raw materials he would prefer to see given lower rates and in the order desired, Mr. Crawford named ore, coal, coke and limestone. He said that in naming these he was considering the fact that the Midvale Steel & Ordnance Co., of which the Cambria Steel Co. is one unit, has plants at points other than Johnstown. Mr. Crawford expressed the belief, supported by exhibits, that a comparison of present steel prices with freight rates shows that the latter are greater than the price levels can stand. Roughly, he said, prices of steel to-day are almost the same as those prevailing in 1913. The heavy increases in freight rates on inbound raw materials and outbound finished steel products made since 1913 were shown to the commission, together with the distances of train movements, and earnings per car mile as well as the freight cost of assembling raw materials. As an instance of his elaborate figures, it was shown by Mr. Crawford that the outbound rates had increased from 105 to 184 per cent since 1913. Wages in that year and at present also were quoted.

A Statement for Steel Corporation Subsidiaries

A STATEMENT was made by L. C. Bihler, traffic manager Carnegie Steel Co., on behalf of Carnegie Steel Co., American Steel & Wire Co., American Sheet & Tin Plate Co., American Bridge Co., and Lorain Steel Co., principally located in the so-called eastern territory. Extracts are as follows:

"The transportation costs on necessary ore, coke and limestone, to produce one ton of pig iron have increased, calculating the freight on the ore from the lower Lake Erie ports, and on the fuels and fluxes from customary points of supply in western Pennsylvania and Ohio, from 74 to 107 per cent in the Mahoning and Shenango valleys, Pittsburgh, McKeesport, Donora, Neville Island, Mingo Junction, Bellaire, and Wheeling districts, when comparing 1921 with 1914. This refers only to the three basic commodities used in blast furnaces for the production of a ton of pig iron; on coke the increase in freight rates is as high as 124 per cent, on limestone 250 per cent, and on coal as high as 236 per cent. There are also other items of substantial increases in freight on supplies, etc., which are in addition to the figures cited, and represent further increase in the cost of production of a ton of steel, such as brick, sand, clay, fluorspar, dolomite, ganister, firestone, etc.; coal for fuel under the boilers, gas producers (in fact, over five tons of various materials are required for the manufacture of a ton of finished steel). The advances on these materials range from 87 to 220 per cent.

"Taking a few principal points of destination on outbound manufactured iron and steel and comparing the rates in effect from Pittsburgh and Youngstown, Jan. 1, 1914, with the present rates, shows increases ranging from 117 to 146 per cent; the increase on class rate traffic as a result of 5, 15, 25 and 40 per cent increases, 1921 vs. 1914, is 112 per cent.

"High freight rates have retarded construction and tend to localize the zone into which a steel mill can ship. Office buildings, apartments and dwelling houses (of

the latter of which many are still needed) must be constructed at reasonable cost. As long as costs of building materials are high and unduly high freight rates prevail, high interest on capital invested will continue, and rents will not come down as fast as they should.

"A study shows average car mile earnings of railroads in the Eastern district approximately 35c. per car mile, including general merchandise, for the first nine months of 1921. As against this average car mile earnings on raw materials to and finished products from Pittsburgh district are as follows:

Ore (Line haul only).....	\$0.493
Coal (Average 30-mile radius).....	2.02
Coke	0.88
Limestone	1.25
Pig iron	0.74
Billets	0.73
Rolled products	1.03

And to and from Youngstown, Ohio:

Ore (Line haul only).....	0.67
Coal	0.91
Coke	0.69
Limestone (Hillsville to Youngstown).....	4.09
Pig iron	0.73
Billets	0.76
Rolled products	1.00

"A comparison of rates, average weights and revenue on plates, structural steel and merchant bars, 1913 vs. 1920, show increase in rate 122.2 per cent, and increase in revenue 193.9 per cent on account of greatly increased average weight per car. . . .

"The iron and steel industry has done its full share in liquidation. On the principle of affording the greatest possible assistance in economic reconstruction of industry in the country, and benefiting the largest number of persons, it is well to consider the fact that a restoration of normal production and shipment of iron and steel will almost double the number of people now employed directly in this industry, in addition to which it would afford employment to an increased number of employees in mines, quarries, coke works and other in-

dustries producing raw materials and supplies, as well as additional workmen in steel consuming plants, to say

nothing of additional employment to railroad employees now idle."

Blast Furnace Interests Under Serious Hardships

IRON and steel buyers of all classes are waiting for lower freight rates before making any unavoidable purchases, W. A. Barrows, Jr., of the freight rate committee of the Eastern Pig Iron Association, told the commission Saturday. He added that the interests he represents do not agree with the opinion expressed by President Daniel Willard of the Baltimore & Ohio Railroad. Mr. Barrows said he was speaking for 16 separate iron and steel companies operating 54 blast furnaces near the eastern seaboard of the eastern group territory, with a total inbound movement of approximately 11,000,000 tons annually in normal times.

It was stated that on Jan. 1, 1922, the market price of pig iron was less than the cost of raw materials and their transportation to the blast furnaces, and that the furnaces he represents are in a desperate condition. Mr. Barrows pointed out that, as a typical instance, pig iron was selling for \$20.50 per ton while the total cost of raw material and transportation was \$24.08. A pig iron price to-day based on the relationship between price and transportation cost which prevailed in 1913, Mr. Barrows said, would be \$27.54 per ton, or 34 per cent above the current price. Such a situation, it was declared, could not be met by an increase in the price of pig iron. The market is absorbing now but a small output and foreign iron is coming from Europe. A recent transaction, he said, was the sale of European pig iron at a north Atlantic port at \$18.65 per ton, c.i.f. No stone had been left unturned by Eastern pig iron makers to reduce their costs. He said that while it might be true as contended by George M. Shriver of the Baltimore & Ohio that freight rates in 1921 showed a smaller advance above the rates he used as the base than was shown in commodities, exactly the reverse was the fact with regard to the selling price of pig iron as related to freight rates.

Taking Pottstown, Pa., as a representative point, Mr. Barrows showed the relative increase in the price of pig iron and the price of transportation entering into its manufacture, taking 3.6 tons of inbound raw material, as follows:

	1901	Jan 1, 1922	Per Cent Increase
Price pig iron per ton.....	\$14.68	\$20.50	40
Rail transportation cost....	6.76	11.13	64.5
Total transportation cost...	8.36	19.01	55.6

This was compared with an exhibit of Mr. Shriver as follows:

	1901	1921	Per Cent Increase
All commodities	108	216	100
All freight rates.....	89	152	71

"Thus while the price of all commodities has increased more than all freight rates," said Mr. Barrows, "the price of pig iron has increased much less than the freight charges on the materials involved in its production. A ton of pig iron is less able today to purchase the transportation necessary to its production than in 1901, or in the years intervening."

To indicate the additional tonnage in raw materials to be achieved by any effective stimulation of the industry in the Eastern group, Mr. Barrows quoted some interesting figures. He said that in 1920 the Eastern

pig iron district produced 3,500,000 tons of pig iron, entailing the transportation of 12,600,000 tons of blast furnace raw materials. In 1921 the production was approximately 1,350,000 tons with a furnace materials traffic of 4,860,000 tons.

Situation of Virginia Furnaces

Asserting that the freight rates on raw materials used in making pig iron exceed the market price of the finished product, M. D. Langhorne, superintendent of the Oriskany operations of the Lavino Furnace Co., speaking for the Virginia Pig Iron Association, told the commission that every blast furnace and iron mine in the Old Dominion is closed because they could not operate without losing from \$4 to \$5 on each ton of pig iron produced.

"Pig iron that sold for approximately \$50 per ton at times during the war period is now selling for about \$20, or at pre-war prices," said Mr. Langhorne. "Freight rates have been raised to a point never imagined, amounting, in our case, to an increase of as high as 186 per cent on ore, 128 per cent on stone and from 255 to 309 per cent on coke. The latter figure, we believe, shows a much greater increase than has been made in the same commodity in any other producing section. We find our industry in a position, regardless of the fact that we have reduced labor and other expenses as low as possible and resorted to the use of cheap high grade foreign ores to increase our tonnage and reduce our coke consumption, where we cannot make iron for less than \$25 per ton, losing on every ton produced from \$4 to \$5. This places us in a position even worse than that of any other iron producing section and has resulted in the closing down of every furnace within the State, as well as all of the ore mines and quarries, leaving the entire pig iron industry in a deplorable and chaotic condition and placing a great hardship on the communities dependent on the operation of these plants for a livelihood.

Bad Adjustment of Ore Rates

J. E. Rotthaus, of the Thomas Iron Co., appeared as a witness Saturday with regard to rates on ore. He said that there is a serious maladjustment of these rates and asked for the elimination of ex parte 74 rates. When asked by Commissioner Hall whether he would extend his proposal to all other commodities, Mr. Rotthaus replied affirmatively, although adding that he was speaking only of iron ore. He said that adjustment of rates on ore in that part of the country was so bad that the richest iron mine in the Wharton, N. J., district had been closed and ores from India, Spain, Sweden, Colombia and Cuba are being used. He said that for 74 miles they had a rate on ore of \$2.05, while competing plants at Bethlehem could obtain imported ore by the way of Constable Hook, N. J., at \$1 per ton or from Cornwall mines in Pennsylvania for \$1.10. A properly aligned rate for his company, he stated, would be 93c. Under the ex parte 74 rate of \$2.25 from Buffalo, he said, the railroads hauled 300,000 tons of Lake Superior ore, while under the preceding rate of \$1.54 they hauled 3,500,000 tons.

Maximum Relief on Coal Rates Urged

REPRESENTING iron and steel manufacturers of the Chicago district, including the Wisconsin Steel Co., the Inland Steel Co., the Illinois Steel Co., and the Steel & Tube Co. of America, and also the Milwaukee Coke & Gas Co., maximum relief in rates on coal was urged by Robert Hula, assistant traffic manager of the Steel

& Tube Co. of America, if in the judgment of the commission reductions can be made under existing circumstances. He likewise requested that, in the event a reduction is made in coal rates, the same measure of reduction be made on coal from the various fields to Lake Erie ports for trans-shipment by boats, inasmuch

as some of the Chicago district manufacturers avail themselves of the Lake service. It was pointed out that the necessity for maintaining a relationship to Lake Erie ports with the all-rail rates is self-apparent. Among the exhibits Mr. Hula presented was one containing a statement of rates and revenues on raw materials and finished products and he called attention to rates on coking coal from various coal fields to the Chicago district beginning with Jan. 1, 1914. This showed marked increases in percentages. Other sheets of this exhibit set forth the high average loading and the resulting revenues, the same information on steam and gas coal, which showed even greater percentage increases, the weighted average being 133.7 per cent; rates on coking coal from various coal fields to the present time, and rates on coke from the Connellsville and Pocahontas ovens to the Chicago district, indicating an increase of 84.8 per cent. It was urged by Mr. Hula that the commission render its decision at the earliest date practicable as the present agitation for reduced rates and the uncertain conditions created thereby act as a check upon commerce.

Do Not Wish to Destroy

In opening his statement, Mr. Hula said, that the interests he represents do not wish to destroy the transportation systems of the country, nor to deny them the right of making fair profits, but if conditions allow the commission to make reductions in transportation rates, "We feel that the condition in our industry warrants the careful consideration of the commission, as the steel industry is considered as one of the business barometers of the country and in our judgment is in a worse economic condition than any other industry with perhaps one exception. Annual reports of many steel companies confirm this statement."

To indicate the volume of tonnage in which the companies are interested, Mr. Hula submitted an exhibition showing they have 1586 coke ovens, with an annual coal consuming capacity of 9,694,000 tons and an annual coke producing capacity of 6,750,500 tons. In addition to the coal requirements of these interests at the coke ovens, it was stated that there are large quantities of coal used for steam and gas purposes, aggregating some 3,000,000 or 4,000,000 tons, all of which indicated these steel companies are interested in approximately 14,000,000 tons of coal. Authorities were cited to show that more coal is consumed annually within the Chicago switching district than is consumed in all of the New England states and further that more coal is consumed in the switching district of Chicago than in all of New York State, including Greater New York. He said:

Current figures indicate that production of steel has not exceeded 38 per cent of steel plant capacities during the year 1921, which fairly reflects the present consumption of and demand for iron and steel products.

Prices of iron and steel products have been reduced in many cases below the cost of production and many companies will be unable to maintain these deflated values unless production costs are decreased by lower assembling charges on the basic raw materials, which have not been reduced since the termination of the war.

Decline of Steel Prices

Mr. Hula said that prices on iron and steel products have declined 62 per cent since August, 1917, this being the war peak, and that present prices are from 18.8 per cent to 22.4 per cent higher than the 10-year pre-war average. He also stated that it was shown at the recent Chicago hearing on rates on iron ore in the Lake Superior district that iron and steel prices today are 48.6 per cent above the 1914 level and also that prices of all commodities are on practically the same basis. He added:

Records indicate, that bars, plates and shapes, which are a large percentage of the Chicago manufacturers' output, are today selling at even lower levels than the average for the entire country. . . . in some instances being less than the prices obtaining in 1913. This means that the Chicago manufacturers have been forced to absorb the entire advance in invoices of raw materials, increased freight

thereon, increased cost of labor, taxes and overhead, occurring since 1913.

Freight rates today on raw materials entering into the manufacture of pig iron in the Chicago district are 76.2 per cent above the 1914 level. This was set forth in an exhibit and it was shown that the assembling costs on coal have been increased to a greater extent than the other raw materials.

Compared with Price of Pig Iron

Mr. Hula said that by comparison with the 1914 price on pig iron at Chicago, which was \$13.69 per ton, it is found that the coal assembling charge of \$2.8719 in the same period, was 21.1 per cent of the selling value. On Jan. 3, 1922, he said, the price of pig iron at Chicago was \$19 per ton, while the assembling charge on coal was \$5.1069, or 26.87 per cent of the selling value. To restore the relationship which existed in 1914, it was found that the present assembling charges on coal should be reduced approximately 21.5 per cent. With steel plants operating at 38 per cent of capacity, Mr. Hula said, it is self-apparent that the consumption of coal and coke is proportionately decreased, which naturally reflects upon the tonnage to be hauled by the interested carriers and therefore any action which will tend to stimulate steel plant operation will likewise increase the volume of tonnage to the carriers. He said that it is the belief of the iron and steel industry in the Chicago district that a reduction in the assembling cost on coal will have more effect upon the resumption of the normal operation and consumption through the fact that the industry will be enabled to maintain the deflated prices to the consumer. Mr. Hula submitted a chart compiled from the article "Prices of Iron and Steel and Other Products" appearing in the annual number of THE IRON AGE of Jan. 5, 1922, for the purpose of illustrating the relative price levels in effect today on various representative commodities and also the railroad rate assembling costs on basic raw materials entering into the manufacture of pig iron. This showed steel beams to be the only commodity that had reverted to the 1913 or ante-war basis, with farm products second, in deflated value, being 14 per cent higher than 1913 prices; metal prices third, or 19 per cent higher; finished steel fourth, or 24 per cent higher, and pig iron fifth, or 27 per cent higher. The average for all commodities shown, he said, is today 49 per cent higher than the 1913 base. Projected on the chart was the railroad freight assembling cost on limestone, iron ore, and coal, which at the present time is approximately 78 per cent higher on coal than in 1913.

Strong Appeal for Shippers

Appearing as the first witness for the shippers, J. D. A. Morrow, vice-president of the National Coal Association, representing approximately 2,000 operators producing 60 per cent of the aggregate bituminous output of the country, urged a heavy nation-wide cut in freight rates on coal as a means of lowering the cost of coal to the ultimate consumer and improving the economic position of the nation. He insisted that inflated railroad rates on coal must come down if costs to the ultimate consumer are to be substantially lowered, both in coal itself and in products manufactured from coal. A material reduction in the rates was declared to be necessary to the industrial and business revival of the United States upon which the prosperity of the carriers as well as the nation at large must depend. Although not definitely suggesting what particular cut in freight rates on soft coal the railroads actually ought to make Mr. Morrow said that, through savings to the carriers to-day in cheaper fuel coal alone, as compared with a year ago and making allowance for the saving in freight rates on their own fuel coal, the railroads undoubtedly would be justified in making a reduction of 75 cents a ton. He added:

In the 12 months ended Sept. 30, 1921, the carriers purchased a little over 130,000,000 tons of fuel coal. The reduction in cost under the average for this year reached 90c. per ton in October, 1921. With a further estimated reduction after April 1 next, the total saving to the carriers would approximate \$215,000,000 under the railroad fuel cost for the 12 months ended Sept. 30, 1921.

If this \$215,000,000 saving in railroad fuel cost should be translated into a reduction in freight rates on bituminous coal and allowance made for the saving to the carriers by reduced rates in the freight charges on their own fuel cost, the total saving to the carriers on their fuel coal costs would compensate for an average reduction of 75c. per ton on the bituminous coal rates of the country.

We are not suggesting 75c. as an average reduction which should be made. We are merely pointing out the fact that by April 1, 1922 such a reduction in all probability would be fully compensated for by the lower fuel costs of the carriers alone, to say nothing of any other reductions in railroad operating expenses.

The savings in the cost of bituminous coal to users, from substantial coal rate reductions, would add greatly to the purchasing power of the people. For example, an average reduction of even 60c. per ton on bituminous coal would release nearly \$1,000,000 a day to be spent in other ways.

Charges Declared Excessive

As indicating the excessive freight charge on haulage of coal to-day, Mr. Morrow pointed out, from records of the carriers before the Interstate Commerce Commission, that the average rate per ton is \$2.27, as against an average sales price at the bituminous mines of \$2.13 a ton, or 14c. higher than the cost of the coal. He stated that the freight charge of \$150 or \$200 on a car of coal which can be bought at the mines for from \$50 to \$100 shows on its face the disproportion between the transportation cost and the market value of the commodity. To make plain the relation of the transportation charges to the present high prices of delivered coal, Mr. Morrow stated that 48½ per cent of each dollar paid for coal ordered by the manufacturer goes to the operator, out of which all his costs must come, while 51½ per cent goes to pay the freight on the coal. Mr. Morrow admitted that inflation in wages of the bituminous coal mining industry must be readjusted, but pointed out that wages already have been reduced to the approximate level of November, 1917, throughout the mining fields which are not controlled by the United Mine Workers of America. In some of the union fields also, wages have been reduced to that approximate level, it was declared. In the remaining fields, Mr. Morrow asserted, wages must be reduced on April 1 next.

Statement by George H. Cushing

Rates on coal and coke in effect on April 6, 1917, the day the United States declared war against Germany, were declared by George H. Cushing, managing director of the American Wholesale Coal Association, to have been reasonable. He said that the trend of prices generally warranted a 50 per cent increase over those applicable on the date mentioned while rates 50 per cent over those existing at that time are unreasonable to the extent they exceed the maximum of increase.

Summarized, Mr. Cushing said that the association he represents is of the opinion that:

1. Coal rates are unreasonable to the extent that they exceed 50 per cent over those of April 6, 1917.
2. Export rates are unreasonable to the extent of \$1 per ton.
3. In any readjustment, the differentials, as between producing districts, prevailing April 6, 1917, should be preserved.
4. Reconsignment and demurrage rates of April 6, 1917, were reasonable and should be restored.
5. Demurrage rates are unreasonable to the extent that they exceed \$2 per car per day.

R. H. Hayden, New York, of the National Association of Purchasing Agents, said that the association by referendum vote had favored deflation in high freight rates similar to that in prices on commodities generally. The association, which, he says has 4,000 manufacturing and industrial concerns affiliated with it, which consume approximately 100,000,000 tons of coal annually, went on record as being overwhelmingly in favor of reduction in freight rates on basic raw materials, especially coal, but that it does not want any cuts made in rates that would injure the credit of the railroads. The association, said Mr. Hayden, would like to see rates decrease along the line by which they were in-

creased in ex parte 74, so that present differentials would be maintained.

By-Product Coke Plants Suffer Severely

The present high rates on coal and coke have had the effect of preventing by-product coke plants from operating and have restricted development of the by-product coking industry, the commission was told Friday by J. D. Forrest of Indianapolis, who spoke for makers of by-product coke north of the Ohio River, among them some steel interests which sell coke. Some by-product plants, it was stated, have been abandoned owing to high freight rates, and stocks of by-product coke in the country aggregating 1,017,000 tons have accumulated, located as follows: Jersey City, N. J., 280,000 tons; St. Paul, 145,000 tons; Indianapolis, 131,000 tons; Terre Haute, Ind., 71,000 tons; Camden, N. J., 33,000 tons; Detroit, 67,000 tons; St. Louis, 55,000 tons; Kansas City, 50,000 tons; Milwaukee, 75,000 tons; Chicago, 85,000 tons; Geneva, N. Y., 25,000 tons. Mr. Forrest said it was not his purpose to advocate specific coking-in-transit rates but that the principle should be recognized. Francis B. James, representing the Providence Gas Co., included among those for whom Mr. Forrest spoke, said his company took exception to this feature of Mr. Forrest's testimony because it was opposed to the principle of coking-in-transit.

By-product plants, Mr. Forrest said, cannot compete with Connellsville beehive ovens because the former have a double haul—coal to ovens and coke to consumer—which results in pyramiding and increasing freight rates and it was pointed out that it requires 1.25 tons of coal to make one ton of by-product coke.

Mr. Forrest said the carriers recognized the crushing burden that rates had been to by-product coke makers and had made some changes and proposed others but now are awaiting a decision by the commission in the present case before making further adjustments. On cross-examination, Mr. Forrest said that a large portion of the output of the by-product coke plants for which he spoke, went to metallurgical plants, but not all to steel plants themselves. Some by-product ovens, he said, are closed down at steel works which are buying beehive coke because of the wide differential in freight rates against by-product ovens. He read figures to show that these differentials vary from a few cents up to 71 cents per ton.

Examiner in Basing Point Case

WASHINGTON, Jan. 24.—John W. Bennett of the regular trial staff of the Federal Trade Commission, has been assigned as examiner at Pittsburgh base case hearing, beginning in Milwaukee Monday next.

A New England manufacturing company desires through THE IRON AGE to learn where it may obtain several rolled steel welded cylinders of a finished outside diameter of 48 in., a length of 6 ft. and a finished thickness of 5/16 to ¾ in. The stipulation is that the finished cylinder must be sufficiently true not to require very heavy counterweighting to maintain a balance at a speed of 220 r.p.m.

A meeting of industrial power will be held in the Engineering Societies Building, New York, Friday evening, Jan. 27. David B. Rushmore, General Electric Co., will preside and papers will be read by John S. Griggs, Jr., consulting engineer, New York, on "Power in Industrial Plants," and by Harold Goodwin, Jr., consulting engineer, Philadelphia, on "Steam Electric Power for the Industries."

The January meeting of the Tri-City chapter of the American Society for Steel Treating will be held Thursday evening, Jan. 26, at Davenport, Iowa, and will be addressed by the president of the National Society, F. P. Gilligan, on the subject, "Quality First." The motion picture of the United States Bureau of Mines, "Manufacture of Steel for Sheets and Plates," will be presented.

Iron and Steel Markets

WINTER SCHEDULES HOLD

Mills Operate at December Rate -Prices Uncertain

Coal Strike Possibilities — Pittsburgh Basing More and More Eliminated

With the ups and downs of steel works operation in January, shown in a range of 40 to 50 per cent for the Steel Corporation and 25 to 40 per cent for the larger independent companies, the rate of new buying has been little changed. The variations have been chiefly in the rate at which mills have replenished buyers' stocks in the different lines.

It is considered a favorable sign that the mills have kept so well up to the rate of December, with the prospect that the present pace can be held pending the appearance of the so-called seasonal demand of February or early March.

While orders are coming in considerable numbers, the volume is not impressive and uncertainty as to the course of prices is not relieved. On the one hand is the expectation, long disappointed, of lower freight rates; on the other hand, the expected coal strike would mean scarcity and higher prices in coal, coke, pig iron and steel. Thus far precautionary buying is not a measurable factor in any of these lines.

At Chicago larger mill operations are expected when steel specifications on recent and pending car purchases come out. The Gary rail mill will resume operations Jan. 30 with a three months' run in prospect. An Illinois Central order for 20,000 tons of rails and one from the Rock Island for 25,000 tons are about to be placed. Prices on track supplies are weak and proximity of mill is more of a factor in the distribution of business. The Lehigh Valley has contracted for repairs to 800 cars. The Great Northern is in the market for 250,000 tie plates.

Railroad equipment features the export market. The South Manchurian Railroad wants 6000 tons of 100-lb. rails, and mills are meeting keen British competition. For Mexican railroad shops \$300,000 worth of machine tools are under consideration. A car builder has taken an export order for 300 cars.

Not in many months have so many new fabricated steel projects appeared as in the past week. Including 10,000 tons for tank work, 57,000 tons is under negotiation. Awards are also large in comparison with recent weeks, being about 16,000 tons.

In the Central West, with soft steel bar prices irregular, hard steel reinforcing bars have settled to 1.40c. in ordinary transactions.

Hot-rolled strip steel of the wider and heavier sizes that compete with steel bars has sold at 1.85c. and in a few cases lower.

Each week develops more cases of departure

from Pittsburgh basing on finished steel. Equalization of freight rates is a natural development of such competition. In wire nails, while the \$2.50 basis has been maintained by leading producers, the use of barges for transport to Ohio River points has given a lower delivered price. A feature in wire is the appearance of seasonal demand for fencing from some of the Southern States.

As the price of Southern pig iron continues to recede, it becomes an increasingly important factor in the North, particularly in the Chicago market, where sales have been made as low as \$15.50, Birmingham, or 50c. lower than the prevailing quotation. In the Pittsburgh district a resale lot of 1000 tons of basic went at \$17.75, Valley, but the lowest price made by a furnace was \$18, Valley, or 25c. below the recent ruling price. The general tendency of foundry iron is downward, and the demand is light, although some jobbing foundries report an encouraging increase of melt. Many foundries continue to figure on the large tonnage required for the New York-New Jersey vehicular tunnel on which bids will be received Feb. 7.

The Steel Corporation, which has been selling ferromanganese at \$60, Pittsburgh, has raised its price to \$58.35, Atlantic seaboard, which has been the price of importers of the British product.

Pittsburgh

PITTSBURGH, Jan. 24.

The most cheerful report about the steel business here is that it is at least holding its own with last month. In a number of lines, orders are more frequent than they were recently, but individually and in the aggregate, they leave much to be desired. As far as prices are concerned the situation is even more unsettled than it has been and the actual selling basis with the sole exception of black and galvanized sheets is very uncertain, due to the fact that there is so little recognition of the Pittsburgh base on the part of mills located outside the Pittsburgh district.

There is considerable equalization of freights on the part of Pittsburgh makers of wire products in competitive territories and business in the major products in districts having a more favorable freight rate from other centers of production is subject to much the same condition. The market in hot-rolled flats, hoops, bands and strips is very much unsettled because of the competition regular makers of these products have to combat from irregular producers. The regular quotation of 2c., Pittsburgh, on those products is merely a quotation, and business actually has been done at least \$5 per ton lower.

The general average of steel mill operations in this district has not changed much since a week ago. The Jones & Laughlin Steel Co. has put on another blast furnace of its Eliza group in Pittsburgh and is getting ready to put on one at its Woodlawn, Pa., plant. This company now has six of its 12 stacks making iron and its steel works operations are at about the same percentage. The Allegheny Steel Co. maintains operation of three open-hearth furnaces and this week has its tube mill in operation as well as 15 sheet mills. The Pittsburgh Steel Co. has added to its active finishing capacity, but is making no iron or steel. On the other

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 24, 1922	Jan. 17, 1922	Dec. 27, 1921	Jan. 25, 1921
No. 2X, Philadelphia.....	\$21.34	\$21.34	\$21.34	\$32.09
No. 2, Valley furnace.....	19.00	19.50	19.50	30.00
No. 2, Southern, Cin'ty.....	20.50	20.50	21.50	34.50
No. 2, Birmingham, Ala.....	18.00	18.00	17.00	30.00
No. 2 foundry, Chicago.....	19.00	19.00	19.00	31.00
Basic, del'd, eastern Pa.....	20.25	20.25	20.25	32.50
Basic, Valley furnace.....	18.00	18.25	18.25	30.00
Bessemer, Pittsburgh.....	21.46	21.46	21.96	33.96
Malleable, Chicago.....	19.00	19.00	19.00	31.56
Malleable, Valley.....	19.50	19.50	20.00	32.00
Gray forge, Pittsburgh.....	20.96	20.96	20.96	30.96
L. S. charcoal, Chicago.....	30.50	31.50	31.50	40.50
Ferromanganese, del'd.....	60.00	60.00	60.00	100.00

Rails, Billets, etc., Per Gross Ton:	Jan. 24, 1922	Jan. 17, 1922	Dec. 27, 1921	Jan. 25, 1921
O.-h. rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh.....	28.00	28.00	29.00	43.50
O.-h. billets, Pittsburgh.....	28.00	28.00	29.00	43.50
O.-h. sheet bars, P'gh.....	29.00	29.00	30.00	47.00
Forging billets, base, P'gh.....	32.00	32.00	32.00	48.50
O.-h. billets, Philadelphia.....	33.74	33.74	33.74	49.24
Wire rods, Pittsburgh.....	36.00	36.00	38.00	57.00
Skelp. gr. steel, P'gh, lb.....	1.50	1.50	1.50	2.45
Light rails at mill.....	1.50	1.50	1.55	2.75

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	1.81	1.81	1.85	2.70
Iron bars, Chicago.....	1.60	1.60	1.60	2.68
Steel bars, Pittsburgh.....	1.50	1.50	1.50	2.35
Steel bars, Chicago.....	1.60	1.60	1.60	2.73
Steel bars, New York.....	1.83	1.83	1.88	2.73
Tank plates, Pittsburgh.....	1.50	1.50	1.50	2.65
Tank plates, Chicago.....	1.60	1.60	1.60	3.03
Tank plates, New York.....	1.83	1.83	1.83	3.03
Beams, Pittsburgh.....	1.50	1.50	1.50	2.45
Beams, Chicago.....	1.60	1.60	1.60	2.83
Beams, New York.....	1.83	1.88	1.88	2.83
Steel hoops, Pittsburgh.....	1.90	2.00	2.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 24, 1922	Jan. 17, 1922	Dec. 27, 1921	Jan. 25, 1921
Sheets, black, No. 28, P'gh.....	3.00	3.00	3.00	4.35
Sheets, galv., No. 28, P'gh.....	4.00	4.00	4.00	5.70
Sheets, blue an't'd, 9 & 10.....	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh.....	2.50	2.50	2.50	3.28
Wire, Pittsburgh.....	2.25	2.25	2.25	3.25
Barbed wire, galv., P'gh.....	3.15	3.15	3.15	4.10
Tin plate, 100-lb. box, P'gh.....	\$4.75	\$4.75	\$4.75	\$7.00

Old Material, Per Gross Ton:	Jan. 24, 1922	Jan. 17, 1922	Dec. 27, 1921	Jan. 25, 1921
Carwheels, Chicago.....	\$15.00	\$15.50	\$15.50	\$21.00
Carwheels, Philadelphia.....	16.50	16.50	16.50	25.00
Heavy steel scrap, P'gh.....	14.00	14.50	14.50	16.00
Heavy steel scrap, Phila.....	11.50	11.50	11.50	14.50
Heavy steel scrap, Chicago.....	11.50	11.50	11.00	15.50
No. 1 cast, Pittsburgh.....	16.50	16.50	16.00	25.00
No. 1 cast, Philadelphia.....	16.50	16.50	16.50	23.50
No. 1 cast, Ch'go (net ton).....	13.00	13.00	12.50	18.00
No. 1 RR. wrot, Phila.....	14.50	14.50	14.50	20.00
No. 1 RR. wrot, Ch'go (net).....	10.50	10.50	10.25	14.00

Coke, Connellsville, Per Net Ton at Oven:	Jan. 24, 1922	Jan. 17, 1922	Dec. 27, 1921	Jan. 25, 1921
Furnace coke, prompt.....	\$2.75	\$2.75	\$2.75	\$5.00
Foundry coke, prompt.....	3.75	3.75	3.75	6.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	13.75	13.87½	13.87½	13.25
Electrolytic copper, refinery.....	13.50	13.62½	13.62½	12.75
Zinc, St. Louis.....	4.65	4.77½	4.82½	5.40
Zinc, New York.....	5.00	5.12½	5.17½	5.55
Lead, St. Louis.....	4.40	4.40	4.37½	4.80
Lead, New York.....	4.70	4.70	4.70	5.00
Tin (Strait), New York.....	31.25	32.00	32.75	32.50
Antimony (Asiatic), N. Y.....	4.45	4.45	4.50	5.50

Composite Price, Jan. 24, 1922, Finished Steel, 2.062c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel.	Jan. 17, 1922, 2.062c. Dec. 27, 1921, 2.062c. Jan. 25, 1921, 3.057c. 10-year pre-war average, 1.684c.
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Composite Price, Jan. 24, 1922, Pig Iron, \$18.39 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Jan. 17, 1922, \$18.52 Dec. 27, 1921, 18.68 Jan. 25, 1921, 30.52 10-year pre-war average, 15.72
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hand, there is a slight falling away in the activities of the American Sheet & Tin Plate Co. and no material gain in the operations of the Pittsburgh district plants of the other Steel Corporation subsidiaries.

The pig iron market has been enlivened by a resale of 1000 tons of standard basic iron to a Pittsburgh district sheet maker at \$17.75, Valley furnace. This is a decline of 50c. a ton from the price ruling on the last previous sale and the closing of a few fair sized tonnages also has served to bring to the surface a weaker situation in foundry iron. The heavier grades of scrap are weaker because of a lack of demand and increased anxiety on the part of dealers to secure orders, but on the lighter materials there is enough demand to keep the market extremely firm. The fuel situation shows no particular change.

Pig Iron.—The trade here has been considerably excited by a recent sale of 1000 tons of basic pig iron at \$17.75, Valley furnace, but needlessly so, because the iron moved was a resale tonnage and the price is not yet representative of the real market in this grade. The iron was a portion of a tonnage being held by a furnace interest on the account of a railroad equipment manufacturer and there is some doubt whether any more of the iron is available at that price. The inquiry, however, served to develop the fact that basic

iron from Valley furnaces was not quotable at higher than \$18, as several Valley producers named that figure on the business, or 25c. per ton below what recently had been quoted. No sales have been made at \$18, but the fact that it has been offered at that price serves to establish it as the market quotation. At this price, basic iron is back at the low point of late last summer. The oil well supply company has closed against its recent inquiry for 3000 tons or more of 1.60 to 2 per cent silicon foundry iron, paying \$18.75, Valley furnace for much of the tonnage and \$19 for the remainder. A sanitary ware manufacturer recently bought 1000 tons of foundry iron, paying \$19, Valley furnace for No. 2 grade. The market here no longer is quotable on No. 2 Valley foundry iron at higher than \$19 and if the oil well supply company's purchase is to be regarded as No. 2 iron, the range would be \$18.75 to \$19. We note a sale of 1000 tons of standard Bessemer iron at \$19.50, Valley furnace and the market on this grade appears to be rather firm on that basis.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic.....	\$18.00
Bessemer.....	19.50
Gray forge.....	19.00
No. 2 foundry.....	19.00
No. 3 foundry.....	\$18.75 to 19.00
Malleable.....	19.50

Ferroalloys.—The market is showing a little more activity in ferromanganese. A Valley steel maker recently closed for a fair sized tonnage on the basis of \$62, Pittsburgh, and we note the sale of 300 tons to a West Virginia steel maker who paid \$61, Pittsburgh, for about 100 tons of 80 per cent material. These sales represent an advance of \$1 to \$2 per ton over the prices recently accepted by the selling interest which, in common with other makers, now is asking \$58.35 Atlantic seaboard, or \$63.67 delivered Pittsburgh common freight point. Current production of ferromanganese by the Carnegie Steel Co. to-day is probably less than the present requirements of the several Steel Corporation subsidiaries which it serves on this material, but it still has a fair sized stock. Other producers and English sales representatives still are quoting \$58.35, Atlantic seaboard, for 80 per cent material, but as yet that price has not prevailed in this district except on small lots. The American Steel Foundries is in the market for 300 tons. The Jones & Laughlin Steel Co. becomes independent of outside sources of supply as a result of the recent purchase of manganese ore and is expected to soon blow in a furnace at its Woodlawn, Pa., plant, for the manufacture of ferromanganese. Efforts to boost the price of 50 per cent ferrosilicon above \$55 furnace, freight allowed, have not been successful, such sales as have recently been made having been at \$54 to \$55. Interest in spiegeleisen in this district is small, but there is a Chicago inquiry for 100 tons before makers. Stocks of this material are light and are mostly of low grade material. Prices are nominal.

We quote 78 to 82 per cent domestic ferromanganese at \$61 to \$63.67 delivered; 78 to 82 per cent foreign ferromanganese, \$58.35, c.i.f. Atlantic seaboard; German, for 76 to 80 per cent, \$54, seaboard. Average 20 per cent spiegeleisen at \$30 to \$32 delivered, Pittsburgh or Valleys; 16 to 19 per cent spiegeleisen, \$28 to \$30 delivered Pittsburgh; 50 per cent ferrosilicon, domestic, \$54 to \$57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Stratsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.80; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 6 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Stratsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Specifications on sheet bars are coming along rather well to the Carnegie Steel Co., and some of the other makers also find consumers more willing to take tonnage due them on contracts, but beyond this business shows no appreciable increase. It is said that some users of billets have pretty well reduced their stocks and that any improvement in the demand for finished products is likely to mean larger orders and specifications. This refers particularly to makers of track equipment, but at present those interests are not getting many sizable orders. Reports are current here that rerolling billets recently sold in the Chicago district at \$28, Chicago. Prices here are not very well defined because of a lack of demand, but quotations represent a fair appraisal of to-day's possibilities.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$29; 2 x 2 in. billets, \$29 to \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$29 to \$30; forging billets, ordinary carbons, \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—There is a fairly steady demand for small tonnages with prices holding within the recent range of \$36 to \$38, Pittsburgh or Youngstown, depending upon the desirability of the business presented and also as to whether it is for domestic or export account. Lower prices usually prevail on the latter kind of business. Prices are given on page 304.

Steel Skelp.—We note a few fair sized sales of steel pipe skelp at 1.50c. Pittsburgh, and no material advance over this base now seems to be obtainable on boiler tube skelp, although some makers are holding at 1.65c.

Wire Products.—Orders and specifications with all makers in this and nearby districts have been larger in the past week than before in some time, but while the market is fairly satisfactory in this respect, it is not so in the matter of prices, for the reason that sales into competitive territory have to meet the quo-

tation ruling in such districts. It is claimed there is no abandonment of the Pittsburgh base prices of \$2.50 base per keg for nails and \$2.25 base per 100-lb. for plain and annealed wire, but equalization of freight charges is common in practically all big consuming districts, this being tantamount to a price reduction. As far as the Pittsburgh district is concerned, the market still is \$2.50 for nails and \$2.25 for wire.

We quote wire nails at \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Steel Rails.—Specifications for standard rails for February and March delivery lately have been coming along rather well from railroads tributary to Pittsburgh. Interest in light rails remains extremely moderate and on those sections rolled from new steel, sales are impossible at more than 1.50c. base. As a matter of fact, some difficulty is experienced in getting even that price, since rails rolled from old standard sections readily are had at 1.45c. and this price, from mills, having favorable freight rates to point of consumption.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.45c. base. Standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Sheets.—Consumers of black and galvanized sheets still are moving with great caution in the matter of purchases and none of the mills seems able to accumulate more than a few weeks' rollings. In spite of this fact, the regular market quotations of 3c. base for black, and 4c. base for galvanized are being strictly observed. It is claimed that there is no money in either grade at less than these prices and there is also the possibility that any deviations from these quotations by independents would be followed by a really steep cut by the Steel Corporation sheet-making subsidiary. The latter reports the past week to have been a rather good one and its operations are understood to be well up to the recent average of 75 per cent. This interest reports some business in the heavier gages of blue annealed sheets at 2.25c. base, but sales of this kind of material on the plate base does not seem to have entirely ceased. Prices are given on page 304.

Tin Plate.—The market is slightly quieter than it has been, due to the fact that specifications are largely in against shipments over the next month or six weeks. Operations of the mills of the American Sheet & Tin Plate Co. reflect the lighter orders, but both this company and the independents are operating at a comparatively high rate for this time of the year. We estimate the current operations of the industry as a whole at around 65 per cent of capacity. Prices do not change much with standard production cokes at \$4.75 per base box Pittsburgh, to carload lot buyers, with the usual concessions to the large consumer.

We quote standard production coke tin plate at \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—Orders are more frequent for cold-rolled and cold-drawn screw stock and shafting, but the demands chiefly are for rounding out depleted stocks and generally are for small lots. A pretty strong effort is being made to maintain a price of 2c. base Pittsburgh, for carload lots, but the fact that a good sized tonnage sold in the Chicago district a short time ago at 1.75c. base, Pittsburgh, has become pretty well known, and makes it hard for makers to maintain 2c. except for rather small tonnages. A southern Ohio maker is reported to have recently named 1.85c. Pittsburgh on a fair sized tonnage. In a general way the market is quotable at 1.90c. to 2c. on lots of a carload or more. Ground shafting is unchanged at 2.25c. base for carloads, f.o.b. mill.

Hoops and Bands.—Hoops are still quoted at 2c. base, Pittsburgh, by most makers, but the market is weak at that price, as where freight rates are in favor of one mill over another, there is a disposition to equalize them. Under conditions of this sort, business has been done as low as 1.90c. Pittsburgh. On bands 2c. base, Pittsburgh, also is quoted by most makers, but as a basis of sales, that figure is almost out of the question. There are instances where a price

of 1.75c. base, on the hoop and band card, has been authorized but failed to bring the business. A range of from 1.75c. to 1.90c. appears to be a fair appraisal of to-day's price possibilities on bands.

Iron and Steel Bars.—Developments of the past week have fully demonstrated that the market is not quotable at more than 1.50c., Pittsburgh, for merchant steel bars of ordinary analysis. It is possible to buy as little as a carload at this price and then for business within this immediate territory because outside mills are making that price f.o.b. mill, and the delivered price runs considerably under the Pittsburgh price, plus the freight. Demand still is for small lots for early delivery. Iron bars also are moving slowly from local mills, because prices here have not responded to declines in other markets.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Structural awards with shops in this district are not at all numerous, and in all instances involve lots of less than 100 tons. Structural inquiries are fairly numerous, but it is too early to say whether they will materialize into active orders in the near future. Most of the shops here have enough orders to maintain a fair rate of operation, but they seem to be well covered on plain material and sales of the latter are small. Sizable lots readily can be placed at 1.50c., Pittsburgh, but 1.60c. is asked on small tonnages. Prices are given on page 304.

Plates.—The past week has developed nothing of interest in this market, demands in all cases being for small tonnages and the mills being so poorly engaged as to tempt operating companies to seek business in other lines. As far as the Pittsburgh district is concerned, the price is 1.50c., base, but in competitive territory this price cannot be obtained.

We quote sheared plates, $\frac{1}{4}$ in. and heavier, tank quality, at 1.50c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Business is holding its own with last month, but still reflects caution on the part of both the jobbers and users, and no big tonnages are going upon makers' books. Slight concessions from regular prices of steel pipe are appearing, but the market hardly is active enough to develop substantial recessions. Plant operations remain relatively high, but this is partly due to the building up of mill stocks since it is expected that demands during the next few months will be largely for spot tonnages. Discounts are given on page 304.

Boiler Tubes.—Only moderate demands are coming out for steel boiler tubes, and since there is not enough business to give all makers a share, competition between mills is keen and prices still lean in buyers' favor. The mill price generally is the card and 5 per cent extra in carloads, but instances are heard where an additional $2\frac{1}{2}$ to 5 per cent has been offered. In less than carloads, there is a supplementary discount of 5 per cent on the card discounts. Card discounts are given on page 304.

Coke and Coal.—It is impossible to chronicle any material change in the situation either as regards prices or demands. Spot offerings of furnace coke are limited, but no more so than the demand, and while the cool weather has stimulated the demand for coke for heating purposes, it is still possible to buy furnace fuel anywhere from \$2.75 to \$3 per net ton oven. Spot foundry coke is in steady rather than active demand with prices ranging from \$3.75 to \$4.25 per net ton, oven, on direct business, and about 25c. per ton higher on business passing through brokerage hands. The coal market has been enlivened slightly by railroad purchases, but in a general way the possibility of a strike of the coal miners as of April 1 has not yet been reflected in the demand. Non-union steam coal still is available as low as \$1.35 per net ton at mines, for mine run grade, ranging from that up to \$1.50, while non-union by-product grade ranges from \$1.45 to \$1.65 on most of the current business. Gas coal being a product of union districts, is not available at less than \$2, and is selling as high as \$2.35.

Hot-Rolled and Cold-Rolled Strips.—There is uniform observance of a base of 3.50c., Pittsburgh, on cold-rolled strips, although weakness in hot-rolled strips, sales of which have been done well below 2c., is causing some complaint among buyers of the former over the spread between the two kinds. This differential is a matter of at least \$30 a ton, and the claim is made that this is too great. The regular makers of hot-rolled strips are quoting 2c. base Pittsburgh, but find it necessary to shade this price in competition with skelp, plate and blue annealed sheet makers.

Nuts and Bolts.—Makers in this district still complain of a slow and unsatisfactory trade with buyers confining their purchases very closely to actual needs. Makers here are not making new quotations, but usually are following those announced in other centers. Discounts are given on page 304.

Rivets.—Leading makers report no decided betterment either as regards the volume or number of orders coming in. There are reports of rather sharp concessions from quotations on large rivets, notably in the East, and Pittsburgh district makers admit having lost business on quotations of \$2.25 base per 100-lb. for large structural rivets. They are, however, holding to that figure and to the usual premium on boiler rivets. Occasional sales of small rivets are being made at 70, 10, 10 and 5 per cent off list. Prices and discounts are given on page 304.

Spikes.—The market is not showing much life nor are prices especially strong. The most recent sizable sale of standard spikes was at \$2.15 base per 100 lb. Pittsburgh, and this now is representative of the market on large lots. On smaller quantities the going price is \$2.20. Small spikes range from \$3.25 to \$3.30 base per 100-lb. with only a moderate demand. Prices are given on page 304.

Old Material.—Prices show considerable irregularity in the steel works grades with heavy material inclined lower because users are out of the market, but showing an opposite tendency in the lighter material for which there is a rather good demand. Sales of cast iron borings recently have been made in this district at \$12, while fair sized tonnages of machine shop turnings have gone as high as \$10.50 and of compressed sheets at \$12. Meanwhile, the consumptive demand for heavy melting steel and other grades finding the same general use, has dwindled to such a point that the market is at least 50c. per ton lower because of the efforts of dealers to find purchasers. The Jones & Laughlin Steel Co. this week put on an additional blast furnace at its Pittsburgh plant partly because it is able to effect a considerable saving in the cost of making ingots by charging hot metal rather than cold scrap. Takings by Steel Corporation subsidiaries also are smaller than they were recently. Consumers of rerolling rails are not much interested because there is no profit in either rerolled bars or rerolled rails, at current prices, even with old rails at \$15.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Hollansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$14.00 to \$14.50
No. 1 cast, cupola size.....	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	15.00 to 15.50
Compressed sheet steel.....	11.75 to 12.00
Bundled sheets, sides and ends.....	10.50 to 11.00
Railroad knuckles and couplers.....	15.00 to 15.50
Railroad coil and leaf springs.....	15.00 to 15.50
Low phosphorus standard bloom and billet ends.....	17.50 to 18.00
Low phosphorus plates and other grades.....	17.00 to 17.50
Railroad malleable.....	12.50 to 13.00
Iron car axles.....	23.00 to 24.00
Locomotive axles, steel.....	21.00 to 22.00
Steel car axles.....	15.00 to 15.50
Cast iron wheels.....	15.00 to 15.50
Roller steel wheels.....	15.00 to 15.50
Machine shop turnings.....	10.00 to 10.50
Sheet bar crop ends.....	14.00 to 14.50
Heavy steel axle turnings.....	11.50 to 12.00
Short shoveling turnings.....	11.00 to 11.25
Heavy breakable cast.....	14.25 to 14.75
Stove plate.....	13.00 to 13.50
Cast iron borings.....	11.50 to 12.00
No. 1 railroad wrought.....	11.50 to 12.00

Chicago

CHICAGO, Jan. 24.

Pending the settlement of the railroad and coal problems as well as difficulties of local scope such as the Chicago building situation, it is felt that caution will continue to actuate the policy of buyers and mill and furnace bookings will not increase materially. Local observers are confident, however, that iron and steel production will not again decline to the low levels of last summer in view of the fact that the large hang-over stocks of 1920 have long since been absorbed. Mere replenishment buying will sustain the present operations of producers and as economic readjustment progresses, the tendency, it is believed, will be toward increased output.

How vital the matter of freight rates is to local producers is illustrated by a recent reduction in export rates from Chicago. Ever since last fall, Pittsburgh mills have enjoyed an export rate of 28c. by rail to New York. With an all-rail export rate of 71c. to the Pacific Coast until recently and latterly a rate of 50c., local mills have had difficulty in competing for Oriental business. Effective Jan. 30, however, a combination rail and river rate of 28c. to New Orleans goes into effect, in anticipation of which a local mill has taken several thousand tons of sheets for Japanese delivery within the past three weeks. Domestic rail rates to the Pacific Coast have not yet been reduced, but a substantial reduction is hoped for in the near future.

Railroad car business continues to be the feature of current market activity. When steel specifications against recent and prospective car orders are booked, improved mill operations are looked for. In the meantime, the general operating situation in this district is on about the same basis as heretofore. The Inland Steel Co. continues to run at 40 to 45 per cent of ingot capacity.

Pig Iron.—The market is quiet, current purchases being confined principally to small lots, ranging from carloads to a few hundred tons. A Chicago district melter has bought 400 tons of foundry for early delivery at \$19, base, local furnace. On the other hand, the Auto Specialties Co., St. Joseph, Mich., has closed for 1000 tons of malleable for second quarter delivery at a reported price which would figure back to \$17.75, base, Chicago furnace. The identity of the seller has not been disclosed and it is possible that the business may have been taken by Detroit or Toledo producers. The freight from Detroit to St. Joseph is \$3.22 as against \$2.94 from Chicago. While reports of shading on local iron are frequent and the market is undeniably weak, it cannot yet be definitely said that the ruling market is below \$19, base, furnace for foundry, malleable and basic. New inquiries of size are few. The Western Electric Co. wants 400 tons of foundry for February shipment and a Terre Haute melter is in the market for 500 tons of malleable for similar delivery. Sellers are of the opinion that the approach of the threatened coal strike will tend to stiffen the market and will drive in considerable business in both pig iron and coke. Southern iron is becoming more of a factor in this district with each reduction in price. A number of carloads have been sold at \$15.50, base, Birmingham, and one producer is now quoting the same price f.o.b. furnace, or the equivalent of \$15.10, Birmingham. Charcoal iron is weaker and at least two producers are now quoting \$27, base, furnace. Buyers of silvery find that the blast furnace product cannot be bought for less than the Jackson County schedule, but electrolytic material is still available at concessions of a dollar or two a ton.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil. 1.60, delivered at Chicago.....	\$30.50 to \$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25.....	19.00
Northern high phos.....	19.00
Southern foundry, sil. 1.75 to 2.25....	\$2.17 to \$2.67
Malleable, not over 3.25 sil.....	19.00
Basic.....	19.00
Low phos., Valley furnace, sil. 1 to 2	
per cent copper free.....	\$2.00
Silvery, sil. 8 per cent.....	\$22.82 to \$4.82

Ferroc alloys.—The American Steel Foundries is in the market for 300 tons of 80 per cent ferromanganese. A local steel mill has bought 100 tons of spiegel Eisen at \$36.50 delivered. A number of Chicago district buyers have closed for the year's requirements in 50 per cent ferrosilicon at the prevailing market, which ranges from \$56 to \$57.50 delivered.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$58 to \$57.50, delivered; spiegel Eisen, 18 to 22 per cent, \$36.50 to \$37, delivered.

Railroad Equipment.—The Central of Georgia has placed 500 box cars with the Mt. Vernon Car Mfg. Co. The Pacific Fruit Express is inquiring for 3300 refrigerator cars. The Chicago Northwestern has ordered 50 passenger service cars from the American Car & Foundry Co., including 20 coaches, 10 smokers, three chair cars, three combination baggage and smokers, nine baggage cars and five baggage and mail cars. The Burlington has put out a formal inquiry for 55 passenger and light freight locomotives.

Rails and Track Supplies.—The Gary mill will resume operation Jan. 30 with about three months' specifications ahead. The Illinois Central and the Rock Island are expected to place orders for 20,000 tons and 25,000 tons respectively in the near future. The Missouri Pacific has placed 500 kegs of standard track spikes with the Illinois Steel Co. and for its Western lines divided 1000 kegs between the Colorado Fuel & Iron Co. and the Kansas City Bolt & Nut Co. Prices on track supplies are weak and the tendency is toward the localization of business. As low as \$37, f.o.b. mill, has been done on tie plates, and 2.10c., Pittsburgh, has been quoted on standard spikes. On track bolts less than 3.15c., Pittsburgh, has been done.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.60c. to 1.65c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.20c., Pittsburgh; track bolts with square nuts, 3.15c. to 3.20c., Pittsburgh; tie plates, steel and iron, 1.85c. to 1.90c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bars.—Current demand for soft steel bars is principally for car construction and reinforcing work. Jobbers are buying little and automobile, implement and miscellaneous manufacturers are not factors in the market. For the Jones Island sewage disposal station at Milwaukee 5000 tons of reinforcing will soon be let. The Dupont Engineering Co. is low bidder on the general contract and is reported to have submitted a figure which was a quarter of a million dollars below most other bids, which were in the neighborhood of a million dollars each. Bids will be opened today on a general hospital at Madison, Wis., requiring 236 tons, and for the Putnam department store, Davenport, noted in the structural material paragraph, 135 tons of reinforcing will be let. Revised bids have been asked on the First National Bank Building, Albuquerque, New Mexico, which originally called for 265 tons. Figures have also been asked on a hotel building for that city. The municipal power plant at Lansing, Mich., mentioned in the structural material paragraph, will require 115 tons of reinforcing. H. L. Vanderhorst, Kalamazoo, Mich., has the general contract for the Stocking vocational school, Grand Rapids, for which 45 tons of structural steel has been let to the Rochester Bridge Co. and 50 tons of reinforcing is still to be bought. Bids will be asked Jan. 31 on the Roosevelt high school, Des Moines, Iowa, a \$350,000 project. Mill prices on soft steel bars are substantially unchanged, although the tendency appears to be towards weakness. The Northern Pacific is said to have bought about 1000 tons for the manufacture of 5,000,000 large rivets at 1.40c., Chicago, but this report lacks confirmation. Bar iron demand is slowly improving, although individual orders remain small. One mill is now on its sixth week of continuous operation, and another, which had been idle since the first of the year, started up Jan. 17. Hard steel bars are not active.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.50c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and sheeting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 3.80c. base. Hoops and bands, 3.10c.

Wire Products.—The better rate of buying noted last week has been sustained. The bulk of the tonnage booked consists of nails, but there is also encouraging activity in light poultry fence, and barbed wire. Jobbers in the South and Southwest are buying more freely than those in the North and Northwest. Owing to the fact that winter weather has forced a suspension of rip track work, railroad purchases of nails have fallen off sharply. Prices appear to be firm on nails, wire and other finished products. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 304.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.65 per keg.

Sheets.—Domestic business is slack, but further orders have been booked for export, the Inland Steel Co. having taken 3000 tons additional for Japan during the past week. Prices are firm.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Cast Iron Pipe.—Sellers are encouraged by the promising business outlook. The United States Cast Iron Pipe & Foundry Co. was the only bidder on 1353 tons for Chicago and was low bidder on 800 tons for Rockford, Ill. The same company was awarded 400 tons through a contractor for the Centralia, Ill., water company. A private inquiry for 1500 tons at Dayton, Ohio, is still pending. Madison, S. D., takes bids on 600 tons today; Grand Rapids, Mich., on 800 tons, Jan. 28; and Brook Park, Ohio, on 250 tons, Feb. 4. Going prices appear to range from \$32.50 to \$34, Birmingham, for 6-inch and above.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$45.60 to \$47.10; 6-in. and above, \$41.60 to \$43.10; class A and gas pipe, \$4 extra.

Bolts and Nuts.—No signs of a revival in buying are to be noted, and no ruling discounts can be named. A number of makers have been quoted f.o.b. factory instead of f.o.b. Pittsburgh, and there appears to be a growing tendency in this direction. It is felt, however, that there will be no general abandonment of the Pittsburgh base until the present case before the Federal Trade Commission has gone to a decision.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to $\frac{1}{4}$ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to $\frac{1}{4}$ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off; blank nuts, \$4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—The insurgent faction in the local building trades unions is now in control and it seems probable that there will be a fight to a finish between organized labor and the proponents of an open shop. Notwithstanding this development, bids will be taken Jan. 28 on 20,000 tons for the headhouse and concourse of the Chicago Union Station. Mill prices are on about the same footing as heretofore, although in some cases fabricators have been able to place large tonnages at as low as 1.50c., Chicago, which is the price at which carbuilders have been buying their steel.

Recent fabricating awards include:

Masonic Temple, Oklahoma City, Okla., 1635 tons, to J. B. Klein Iron & Foundry Co., that city.

Store building for Leopold Metzger, Minneapolis, 107 tons, to Crown Iron Works, that city.

Municipal and Memorial Building, Ironwood, Mich., 117 tons, to Worden-Allen Co.

Gates, rods and miscellaneous shapes for Chippewa Reservoir dam, Winter, Wis., 150 tons, to Worden-Allen Co.

Tuberculosis hospital, National Soldiers' Home, Milwaukee, structural steel, 123 tons, to C. Hennecke Co., Milwaukee, steel sash, 140 tons, to Robertson & Jackson, Inc., Milwaukee.

Bridge tramway, Cheswick Power Co., Cheswick, Pa., 400 tons, to Heyl & Patterson, Pittsburgh.

Pending business includes:

Municipal power plant, Lansing, Mich., 1470 tons, low bidders on general contract, Dupont Engineering Co. and Walbridge-Aldinger Co.

Jones Island sewage disposal plant, Milwaukee, 450 tons of structural steel and 5000 tons of reinforcing, Dupont Engineering Co., low bidder on general contract.

Futnam Department Store, Davenport, Iowa, 1020 tons, bids to be submitted this week.

Bridge over Missouri River, Booneville, Mo., 4000 tons.

The mill quotation on plain material ranges from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Plates.—Local mills will furnish 70,000 tons of steel for the cars recently placed by the Union Pacific, the Illinois Central and the Central of Georgia. It will be some time, however, before the specifications for this material are prepared. Outside of additional railroad car business on the verge of being placed, there is little plate tonnage in prospect. A number of tank inquiries for the Louisiana and Oklahoma oil fields have been figured on by local fabricators, but there is no certainty that orders will result. Carbuilders continue to buy plates at 1.50c., Chicago, while the general market is from \$2 to \$4 higher.

The ruling mill quotations range from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Old Material.—A large local mill has bought about 10,000 tons of heavy melting at a reported price of \$11.75, and there has also been somewhat better buying by bar iron mills and foundries. Both buyers and sellers believe that present prices are scraping bottom and that the next swing is likely to be upward. Generally speaking, the market cannot yet be termed active and the price situation is substantially unchanged, a few advances being balanced by declines in other commodities. On Jan. 31, the Government will take bids at Chicago on 31,000 gross tons of shells located at Savanna, Ill., Columbus, Ohio, and Toledo. Railroad offerings include the Burlington, 4000 tons; the Sante Fe, 3300 tons, and the New York Central and the Big Four, blank lists.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails.....	\$16.00 to \$16.50
Relaying rails.....	20.00 to 25.00
Cast iron car wheels.....	15.00 to 15.50
Hot rolled or forged steel car wheels.....	13.00 to 13.50
Steel rails, rerolling.....	12.00 to 12.50
Steel rails, less than 3 ft.....	12.50 to 13.00
Heavy melting steel.....	11.50 to 12.00
Bricks, switches and guards cut apart.....	11.50 to 12.00
Shoveling steel.....	11.00 to 11.50
Low phos. heavy melting steel.....	13.50 to 14.00
Drop forge flashings.....	7.50 to 8.00
Hydraulic compressed sheet.....	7.50 to 8.00
Axle turnings.....	8.50 to 9.00

Per Net Ton	
Iron angles and splice bars.....	14.00 to 14.50
Steel angle bars.....	10.50 to 11.00
Iron arch bars and transoms.....	15.00 to 15.50
Iron car axles.....	19.50 to 20.00
Steel car axles.....	12.50 to 13.00
No. 1 bushelling.....	8.25 to 8.75
No. 2 bushelling.....	6.00 to 6.50
Cut forge.....	10.00 to 10.50
Pipes and flues.....	6.50 to 7.00
No. 1 railroad wrought.....	10.50 to 11.00
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	11.25 to 11.75
Coil springs.....	12.50 to 13.00
No. 1 machinery cast.....	13.00 to 13.50
No. 1 railroad cast.....	12.50 to 13.00
Low phos. punchings.....	11.00 to 11.50
Locomotive tires, smooth.....	9.50 to 10.00
Machine shop turnings.....	4.50 to 5.00
Cast borings.....	6.00 to 6.50
Stove plate.....	12.00 to 12.50
Grate bars.....	10.50 to 11.00
Brake shoes.....	10.50 to 11.00
Railroad malleable.....	11.25 to 11.75
Agricultural malleable.....	11.25 to 11.75

New York

NEW YORK, Jan. 24.

Pig Iron.—Interest in the pig iron market still continues to center in the bids to be received Feb. 7 on the segments for the New Jersey-New York vehicular tunnel. While many companies are showing an interest and are figuring on how they can bid, prevailing opinion is that only a very few are equipped to make the segments and it is probable that the tonnage will be divided among not more than three or four bidders. The policy of the furnaces has not yet been defined and it does not seem probable that there will be any definite announcement of policy until after the contract for the segments has been awarded. Then the furnaces will figure with successful contractors. Among others interested is an importer of foreign iron, but there seems to be no prospect of any foreign iron going into the tunnel. Prices of English, Belgian and French iron are such that they cannot meet competi-

tion in this country, except possibly on the Pacific Coast. Considerable figuring, is being done on export iron to the Far East and it seems to be within the range of possibility that some iron, preferably from the South, can be sold for that shipment. Generally speaking, the market is quiet with some jobbing foundries showing a very comfortable increase in business. The usual asking price of No. 2, plain eastern Pennsylvania iron is \$20, furnace, but buyers claim to be able to buy at \$19.50.

We quote delivered in the New York district as follows, having added to furnace prices \$2.62 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.35	\$23.02 to \$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52 to 23.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.02 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 24.96
No. 2 Virginia, sil. 1.75 to 2.25	27.16 to 28.16

Ferroalloys.—Demand for ferromanganese is still light and confined to carload lots for early delivery, sales of the British alloy being noted at \$58.35, seaboard. There is also a little activity in spiegeleisen, light sales having been made at \$26, furnace, for the 20 per cent grade and at \$25, furnace, for the 15 to 19 per cent alloy. The purchase of 20,000 tons of Brazilian high grade manganese ore by a large independent Pittsburgh steel maker at 22c. per unit, seaboard, has created considerable interest in this market and it is reported that a further 10,000 tons has been sold to the same consumer. These sales establish a market for this material, none having been sold in many months heretofore. Quotations for 50 per cent ferrosilicon are unchanged at \$55 to \$60 per ton, delivered, depending on the consuming point and the quantity involved; purchases are confined to small lots, although active negotiations are in progress by leading producers and importers to close contracts for 1922. There is no demand for ferrochrome. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	\$60.00 to \$63.00
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegeleisen, 20 per cent, furnace, per ton	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton	\$55.00 to \$60.00
Ferrotungsten, per lb. of contained metal	.40c. to .50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	.13c. to .14c.
Ferrovandium per lb. of contained vanadium	\$4.00

Ores

Manganese ore, foreign, per unit, seaboard	.22c. to .26c.
Tungsten ore, per unit, in 60 per cent concentrates	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$25.00 to \$27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York	.50c. to .60c.

Finished Iron and Steel.—Though the local steel market as a whole is very quiet, the past week has brought a marked increase in the number and aggregate tonnage of structural steel projects. Fabricators are figuring on more work than has come their way since 1920. At least 30,000 tons are involved in six new operations in New York City on which bids are now being received. Many of the jobs now up for bids are revivals of undertakings that were figured on before but did not then go ahead. Among the projects being bid on may be mentioned the following:

Hospital, Elizabeth, N. J., 1000 tons.
Office building, Madison Avenue near Thirty-fourth Street, New York, 1000 tons.
Office building, Washington, D. C., 1000 tons.
Addition to store of R. H. Macy & Co., New York, 8000 tons.
Hotel, Syracuse, N. Y., 3500 tons.
New York Cotton Exchange building, 3000 tons.
Apartment house, Long Island City, 500 tons.
Office building at Fifth Avenue and Thirty-sixth Street, New York, 2000 tons.
Standard Oil Co. building, New York, 5000 tons.
Hospital, Baltimore, 1000 tons.
Power plant for Brooklyn Edison Co., 600 tons.
Building projects for which the steel fabrication awards have been made are as follows:
Apartment hotel, 2120 Broadway, New York, 900 tons, to A. E. Norton Co.
Apartment building at Riverside Drive and 168th Street, New York, 560 tons, to A. E. Norton Co.

Apartment building at Lexington Avenue and Eightieth Street, New York, 500 tons, to A. E. Norton Co.

Apartment hotel at 37 Fifth Avenue, New York, 550 tons, to A. E. Norton Co.

Apartment building at 189 West Seventy-first Street, New York, 450 tons, to A. E. Norton Co.

Two buildings at Johns Hopkins University, Baltimore, 600 tons, to McClintic-Marshall Co.

Oil tanks for Vacuum Oil Co., New York, 1700 tons, to Warren City Boiler Works, Warren, Ohio.

Work for Central Railroad of New Jersey, 150 tons, to Phoenix Bridge Works.

Seventeen 80,000-bbl. oil tanks at Cushing, Okla., for the Sinclair Crude Oil Purchasing Co., 5000 tons of plates, to Phoenix Iron Works Co.

Two buildings in Newark, N. J., 300 in one and 200 in another, to Hay Foundry & Iron Works.

Not much new railroad work is coming to light, but it is expected that cars and locomotives under consideration by the Chicago, Burlington & Quincy Railroad will be placed this week. The freight cars number 7300 and locomotives 55. The Chicago & Northwestern Railroad has placed 45 passenger cars with the American Car & Foundry Co. and the Long Island Railroad has ordered 40 passenger cars from the same company. The Chicago, Burlington & Quincy has ordered 62 passenger cars with the Pullman Co. and 53 baggage cars and mail cars with the Standard Steel Car Co. The American Car & Foundry Co. has booked 300 box cars for export and will require about 300 tons of steel for the work. The Lehigh Valley Railroad has placed an order with the Pressed Steel Car Co. for the repair of 200 freight cars and orders have also been placed for 600 others. The Great Northern is in the market for 250,000 tie plates. Developments in the steel market are few. Prices are weak and 1.45c., Pittsburgh, now thoroughly represents the market on plates, shapes and bars, with some concessions from this level on very desirable business. Tin plate shows weakness whenever a good inquiry makes its appearance, despite the fact that the mills are operating nearly at capacity; it is being sold for domestic shipment fully \$5 a ton below the \$4.75 price, while further concessions have been made for export trade. Sheets appear firm at 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, all base Pittsburgh. Wire nails have been sold down to \$2.40 per 100 lb. keg, Pittsburgh. About 2000 tons of steel bars for a job at Seattle, Wash., will be placed by a Seattle company which obtained the contract. Eastern contractors who were bidding on the work had made inquiry here for the steel.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.83c. to 1.88c.; plates, 1.83c. to 1.88c.; structural shapes, 1.83c. to 1.88c.; bar iron, 1.83c. to 1.88c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The market continues dull. There is some slight activity in sheets, black and galvanized, but prices are weak, probably caused in part by offers at low prices from over-stocked dealers. While small lots out of warehouse will bring up to as high as 5c. per lb., base for galvanized and 4c. per lb. for black, on any reasonable quantity 4.75c. per lb. and 3.75c. per lb. could be done. The brass and copper market is fairly active and spring purchases are expected to swell considerably the present volume of business. Copper sheets for roofing will probably begin to show more activity by the end of February. Wrought iron and steel pipe warehouses report the usual seasonal dullness. We quote prices on page 320.

High Speed Steel.—The market is similar in every respect to previous weeks. Most producers report a few exceedingly small orders. Quotations on 18 per cent tungsten high speed steel are nominally 85c. to 95c. per lb. with special brands of some companies ranging up to as high as \$1.05 per lb.

Cast-Iron Pipe.—No new municipal lettings are in sight, but despite the dullness natural to this season, orders are reported by one maker, as more numerous than for the same month of last year and his foundry is operating at about 65 per cent of capacity. A general feeling of optimism is reported, based upon construction prospects in the spring. We quote per net

ton, f. o. b., New York, carload lots, as follows: 6-in. and larger \$47.80; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Old Material.—The market is quiet. Buying prices are slightly lower with some dealers, while others are quoting the same as last week. Specification pipe has been slightly advanced by some brokers. One of these has increased his price twice in the past week. Another is quoting up to \$7.75 per ton as a buying price. Relaying rails would probably bring \$27 to \$28 per ton, although the purchase of a small tonnage by a contractor for use in New York State was reported last week at about \$22 per ton delivered. Stove plate has stiffened slightly and dealers who have had recent transactions state that they have paid as high as \$10.50. Heavy melting steel remains unchanged at \$7.50 to \$8. Short length rails have declined about 50c per ton from last week's quotation, \$8 to \$8.50 per ton now being a fair offering price.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$7.50 to	\$8.00
Steel rails, short lengths, or equivalent.....	8.00 to	8.50
Re-rolling rails.....	9.50 to	10.00
Relaying rails, nominal.....	27.00 to	28.00
Steel car axles.....	10.00 to	10.50
Iron car axles.....	18.50 to	19.00
No. 1 railroad wrought.....	10.00 to	10.50
Wrought iron track.....	8.00 to	8.50
Forge fire.....	5.00 to	5.50
No. 1 yard wrought, long.....	8.50 to	9.00
Cast borings (clean).....	7.50 to	8.00
Machine-shop turnings.....	4.00 to	5.00
Mixed borings and turnings.....	4.00 to	4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	7.25 to	7.75
Stove plate.....	9.50 to	10.50
Locomotive grate bars.....	9.00 to	10.00
Malleable cast (railroad).....	8.00 to	8.50
Car wheels.....	10.50 to	11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$16.50 to	\$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	15.50 to	16.00
No. 1 heavy cast, not cupola size.....	14.00 to	14.50
No. 2 cast (radiators, cast boilers, etc.).....	10.00 to	10.50

Philadelphia

PHILADELPHIA, Jan. 24.

A slightly perceptible increase in orders for certain steel products has been noted by steel mills in the past week. The heavier products—plates, shapes and bars in particular—have gained little, if any, but the demand for tin plate, sheets and wire products is somewhat better. A new feature is seasonal demand for wire fencing from some of the Southern States. Orders for structural steel have not shown any marked improvement, but a greater number of projects is being figured, and the outlook becomes somewhat more promising. Jobbers are placing more business, but the orders are small. In pig iron the same dullness that has prevailed since the first of the year is still in evidence and January sales in this district will fall considerably below those of December.

Pig Iron.—No change worthy of note has occurred in the pig iron situation. The past week has been quiet, but no more so than the preceding weeks of this year. The most important transaction was the purchase by a radiator manufacturer at Trenton, N. J., of 1200 tons of No. 2 plain iron, the business being divided among three furnaces. Eastern Pennsylvania furnaces have quoted the Saco-Lowell Shops and the Gurney Heater Co., both New England interests, on about 2000 tons each of foundry iron, and there are a few other inquiries in the market ranging from 500 to 2000 tons. Some second quarter inquiry has appeared and a few sales have been made for that delivery. About 400 tons of Buffalo No. 2 plain iron was sold to a central Pennsylvania melter for second quarter shipment at \$19, Buffalo. Interest in the 100,000 tons of pig iron required for the New York-New Jersey vehicular tunnel is keen, but some Eastern furnaces have decided not to quote because of the long deliveries. Prices of foundry iron remain fairly steady at \$20 for No. 2 plain, \$20.50 for No. 2X and \$21 for No. 1X, all

f.o.b. furnace. Concessions from these prices are granted where the furnace has a freight rate disadvantage in competition with other furnaces, but such concessions have usually been small. On one transaction a furnace went as low as \$19.50, furnace, for No. 2 plain. A steel company inquiring for basic has been quoted \$19, furnace, by one basic maker, but is trying to buy at a better price.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.....	\$20.84 to	\$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.....	23.34 to	23.76
Virginia No. 2 plain, 1.75 to 2.25 sil.....	27.24 to	27.74
Virginia No. 2X, 2.25 to 2.75 sil.....	27.74 to	28.24
Basic delivery eastern Pa.....	20.50 to	21.50
Gray forge.....	20.50 to	21.50
Malleable.....	23.00 to	24.00
Standard low phos. (f.o.b. furnace).....	24.00 to	25.00
Copper bearing low phos. (f.o.b. furnace).....	28.00 to	29.00

Ferroalloys.—The Steel Corporation, which has been selling ferromanganese at \$60, Pittsburgh, has decided to quote \$58.35, Atlantic seaboard, which is the price quoted by other domestic producers and also by importers of the British alloy. The American Steel Foundries is in the market for 300 tons. There is little demand for spiegeleisen, which is obtainable at about \$25, furnace.

Semi-Finished Steel.—There is some demand for forging billets, but little for re-rolling quality. The former grade is quoted at \$32 to \$33, Pittsburgh, and the latter at \$28 to \$29, Pittsburgh. Sheet bars and slabs are also obtainable at \$28 to \$29, Pittsburgh.

Plates.—Eastern mills are not gaining in plate bookings. Mills which are willing to make price concessions are faring somewhat better than their competitors as to tonnage. On ordinary lots 1.45c. and 1.50c., Pittsburgh, are quoted, some mills adhering quite firmly to the latter quotation. Buyers with attractive orders to place, claim to be able to get quotations equivalent to 1.40c., Pittsburgh, or lower, but there is no confirmation of sales below 1.40c.

Structural Steel.—Fabricators are figuring on more work than has come their way in some time, but little business has been placed in the past week or two. Bids will be requested soon on 3000 tons for the new Philadelphia public library. The Belmont Iron Works will fabricate 900 tons for the Western Union Building at Eleventh and Locust streets. Plain material is being sold at 1.45c. and 1.50c., Pittsburgh.

Bars.—A re-rolling mill is reported to have taken 300 tons of reinforcing bars for the Philadelphia-Camden bridge at a price equivalent to 1.35c., Pittsburgh. Another lot of 300 tons for a fence around a large estate near Philadelphia was sold at 1.40c., Pittsburgh. A Detroit automobile manufacturer is in the market for about 5000 tons of bars for early shipment. Soft steel bars are fairly firm at 1.50c., Pittsburgh, and most of the cutting is on reinforcing quality.

Warehouse Business.—The willingness of the steel mills to book even the smallest tonnages is cutting down the demand for steel out of stock. Local warehouses report no gain in volume of business. Prices for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ½-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.10c.; iron bands, 3.80c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Sheets.—Prices of sheets show resistance. Apparently there are no concessions being offered by the mills, except that one or two plate mills have been selling annealed tank quality steel sheets as a substitute for blue annealed on the plate basis of 1.50c., Pittsburgh. There has not been enough of such selling, however, to disturb the market seriously. Regular blue annealed makers have little difficulty in getting 2.25c., Pittsburgh, from their established trade. Black

sheets at 3c. and galvanized at 4c., Pittsburgh, are quite firm. Concessions on tin plate appear to have been made, prices as low as \$4.50 per 100 lb. base box being reported.

Wire Products.—A better demand for wire products is noted, particularly fence wire and woven wire fencing, demand for the latter coming principally from the South. Prices are holding except that wire nails are being offered at \$2.40 per keg by makers who use rejected wire rods as their raw material.

Old Material.—Two blast furnaces came into the market last week for borings and turnings, one paying \$9.25, delivered, for 500 tons, and another \$10.25 for a similar quantity. Otherwise there is little demand and prices are stationary. We quote for delivery at consumers' works in this district as follows:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling.....	15.50 to 16.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.00 to 12.50
No. 1 forge tire.....	10.00 to 10.50
Bundled sheets (for steel works)....	9.50 to 10.00
No. 1 busheling.....	11.00 to 12.00
No. 2 busheling.....	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use).....	9.25 to 10.25
Mixed borings and turnings (for blast furnace use).....	9.25 to 10.25
Machine-shop turnings (for rolling mill and steel works use).....	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills).....	12.00 to 12.50
Cast borings (for chemical plants) ..	13.50 to 14.00
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	14.00 to 14.50
Stove plate (for steel plant use)....	14.00 to 14.50
Railroad malleable.....	13.00 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications).....	11.50 to 12.00
Iron car axles.....	No market
Steel car axles.....	17.00 to 18.00

St. Louis

ST. LOUIS, Jan. 24.

Pig Iron.—Demand for pig iron is confined largely to carloads, the two largest inquiries being for 150 tons each. One of these is from a local melter, the other from a Southern Illinois steam specialty manufacturer. Orders for carloads come from all over the St. Louis trade territory, but the total volume is small. Two furnaces have been taken off by the American Steel Foundries and one furnace has been blown out by the Commonwealth Steel Co. Stove plants in St. Louis have not reopened since the holidays, there is a strike among the Belleville, Ill., plants, and there is little activity among the stove foundries at Quincy, Ill. The market is nominal at \$19, Chicago, and \$16, Birmingham, but lower quotations have been made. On the other hand, one producer reports sales of a few carloads of Northern iron at \$20, Chicago. Several cars of ferromanganese and one car of 50 per cent ferro-silicon were sold.

We quote delivered consumers' yards, St. Louis as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25.....	\$21.88
Northern malleable, sil. 1.75 to 2.25.....	21.88
Basic.....	21.88
Southern foundry, sil. 1.75 to 2.25.....	21.91

Finished Iron and Steel.—The Texas & Pacific Railroad, Dallas, Tex., is in the market for 37,000 pairs of 85-lb. angle bars, about 925 tons, and the St. Louis Southwestern wants 2500 pairs of 56-lb. angle bars. The Missouri, Kansas & Texas placed an order for its requirements for six months for locomotive tires, and another St. Louis road has contracted for requirements for a similar period. The Missouri Pacific placed an order for 1000 kegs of track spikes, in addition to 1000 reported in THE IRON AGE last week. The Union Pacific has postponed for several weeks the placing of orders for 25 each of baggage, passenger and observation cars. Demand for wire rods is improving, and the sale is reported of 200 tons to a Kansas City concern. Demand for pipe is fair, but an improvement is indicated in Oklahoma and the Mexico, Tex., fields because of the advance in crude oil, which is expected to increase

drilling operations. The Colorado Fuel & Iron Co. got an order for 300 tons of reinforcing bars for a San Antonio, Tex., job. The building labor situation has been made more complex by the refusal of the Building Trades Council to accept by an overwhelming vote the proposal of the Master Builders' Association for a reduction of 20 per cent in wages.

For stock out of warehouse we quote: Soft steel bars, 2.62½c. per lb.; iron bars, 2.62½c.; structural shapes, 2.72½c.; tank plates, 2.72½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, 3.52½c. per 100 lb.; boiler rivets, 3.62½c.; tank rivets, 7/16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 65-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, 4; and tapped, 3.75 off list.

Coke.—Inquiry for coke is limited, except in carload lots to furnace grades used by water gas companies. Two lots of 6000 tons each of Granite City by-product were sold and other scattering sales brought the total sales for the week around 12,000 to 14,000 tons for shipment through first half and all of 1922. Foundry coke is inactive, no more than carload sales being made, and no inquiries of note pending. Demand for domestic coke is better because of colder weather in this section.

Old Material.—Buying of heavy melting steel and rolling mill grades is at a standstill. Prices are in some instances weaker. There are no railroad offerings of consequence this week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails.....	\$15.00 to \$15.50
Steel rails, rerolling.....	11.50 to 12.00
Steel rails, less than 3 ft.....	11.50 to 12.00
Relaying rails, standard section.....	23.00 to 28.00
Cast iron car wheels.....	14.00 to 14.50
No. 1 heavy railroad melting steel....	10.50 to 11.00
No. 1 heavy shoveling steel.....	10.00 to 10.50
Ordinary shoveling steel.....	9.00 to 9.50
Frogs, switches and guards cut apart	10.50 to 11.00
Ordinary bundle sheet.....	4.50 to 5.00

Per Net Ton	
Heavy axle and tire turnings.....	5.00 to 5.50
Iron angle bars.....	13.50 to 14.00
Steel angle bars.....	9.00 to 9.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	13.50 to 14.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought.....	9.50 to 10.00
No. 2 railroad wrought.....	8.50 to 9.00
Railroad springs.....	11.25 to 11.75
Steel couplers and knuckles.....	11.25 to 11.75
Locomotive tires, 42 in. and over, smooth inside.....	8.00 to 8.50
No. 1 dealers' forge.....	7.00 to 7.50
Cast iron borings.....	5.50 to 6.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers cut in sheets and rings..	7.00 to 7.50
No. 1 railroad cast.....	13.00 to 13.50
Stove plate and light cast.....	11.50 to 12.00
Railroad malleable.....	9.50 to 10.00
Agricultural malleable.....	9.00 to 9.50
Pipes and flues.....	7.50 to 8.00
Heavy railroad sheet and tank.....	6.00 to 6.50
Light railroad sheet.....	4.50 to 5.00
Railroad grate bars.....	9.50 to 10.00
Machine shop turnings.....	4.50 to 5.00
Country mixed iron.....	6.50 to 7.00
Uncut railroad mixed.....	7.00 to 7.50
Horseshoes.....	9.50 to 10.00
Railroad brake shoes.....	9.00 to 9.50

Boston

BOSTON, Jan. 24.

Pig Iron.—New England foundries have continued a policy of buying pig iron only as needed. They have not been convinced it is time to anticipate requirements, first, because the average daily melt shows little appreciable increase, and second, because no concerted movement has been made by eastern Pennsylvania and Buffalo furnace interests to hold prices. Buying the past week has been of a hand-to-mouth character or for mixture purposes. The immediate future is more promising, however. A manufacturer of textile machinery may close shortly on 500 tons to 1000 tons each of No. 1X and No. 2X for immediate delivery; the Gurney Heater Co., Framingham, Mass., on 1000 tons No. 2 plain or more, second quarter delivery; a Connecticut foundry on 500 tons No. 2X, delivery extending over next three months; Massachusetts stove interests on varying tonnages, which in the aggregate make a good showing; and there are several smaller inquiries. Other prospective tonnages are in

the making, for supplies are close to nothing, notwithstanding small weekly melts. Most Connecticut foundries have small stocks because some time back they made a price settlement rather than take high-priced iron. Firmer prices on special analysis iron are noted. A special low phosphorus malleable sold this week at \$23, furnace; high manganese Buffalo at \$20, furnace, and off malleable at better than \$19, furnace. Eastern Pennsylvania No. 2X apparently is obtainable at \$19.50 furnace. One of the most active Buffalo furnaces refuses to meet that price, turning down 500 tons. Numerous small quantities of Alabama iron were placed in Massachusetts and Connecticut this week at \$16 and \$16.50, furnace base. Little was done in Virginia iron. Delivered prices follow:

We quote delivered at common New England points as follows, having added to furnace prices \$4.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	\$24.06 to \$25.06
East. Penn., silicon 1.75 to 2.25	23.56 to 24.56
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	29.08 to 29.58
Virginia, silicon 1.75 to 2.25	28.58 to 29.08
Alabama, silicon 2.25 to 2.75	27.16 to 27.66
Alabama, silicon 1.75 to 2.25	26.66 to 27.16

Finished Material.—Mill representatives report little business this week, and prices as barely steady. The fact that bar business recently was placed at 1.45c., Pittsburgh, and the Maine Central has bought small tonnages of plates at less than 1.50c., have had an unsettling influence on trade. The one bright spot is the structural steel market. No large tonnages were placed this week, but will be shortly, and further sizable business is in the making. Warehouses in some instances shortly will be obliged to place business but the volume involved is problematical. Their business is improving, although slowly. With the exception of a reduction of 50c. a keg on rivets, and a spread of \$3.50 to \$3.75 in wire nails, the local warehouse price situation shows little change.

Jobbers now quote: Soft steel bars, \$2.55½ per 100 lb. base; flats, \$3.05½; concrete bars, stock lengths, \$2.55½; structural angles and beams, \$2.65½; plates, \$2.65½ to \$2.83; tire steel, \$3.85 to \$4.25; open hearth spring steel, \$4.50; crucible spring steel, \$11.50; bands, \$3.15½ to \$3.53; hoop steel, \$3.15½; cold rolled steel, \$3.55 to \$4.05; toe calk steel, \$8; refined iron, \$2.55½ per 100 lb. base; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50.

Coke.—One order for 1000 tons of by-product foundry coke was placed by a Massachusetts foundry this week. Business otherwise was confined to small tonnages of spot and to releases of small tonnages on contract, the latter predominating. Both the New England Coal & Coke Co. and the Providence Gas Co. quote foundry coke at \$10.40, delivered, where the local freight does not exceed \$3.40, but the undertone of the market is reported as firmer. The firmness is based more on an anticipated curtailment of the Connellsville output rather than on prospects of a greater demand in New England within the immediate future. The statistical position of coke in New England foundry yards is such that any interruption in transportation, due to snow or ice, undoubtedly would place pig iron melters in an uncomfortable position.

Old Material.—On those old materials for which any demand exists, prices are firmer. Business the past week, however, was largely between dealers. Comparatively small tonnages are going into consumption. The Crompton & Knowles Loom Works, Worcester, Mass., inquiry on 1000 tons No. 1 machinery has strengthened the market. That is, the inside price seldom is quoted lower than \$18 delivered, whereas a week ago less could be done. Car lots have been sold this week at \$18 to \$18.50, delivered, and in one instance at \$18.80. A high freight rate was involved in the latter transaction. There is no market for stove plate or railroad malleable. New England and New York melters have bought horseshoes this week in carload lots, for which the dealer paid \$18.50. Heavy melting steel is firmer on buying by Worcester, Mass., interests. Little inquiry comes from Pennsylvania mills for steel. Boring continues in demand and are firmer because of their scarcity. A local dealer this

week paid \$5.20 for skeleton, but that price is exceptional.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	\$18.00 to \$18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	15.00
Railroad malleable	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$8.00 to \$9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe (1-in. in diam., over 2 ft. long)	7.00 to 7.25
Machine shop turnings	3.25 to 3.50
Cast iron borings, rolling mill	7.25 to 7.50
Cast iron borings, chemical	8.00 to 8.25
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	10.50 to 11.00
Car wheels	11.50 to 12.00
Revolving rails	10.00 to 10.50

Buffalo

BUFFALO, Jan. 24.

Pig Iron.—Further evidences of a weakening in the market is furnished by the statement of two furnaces that \$19.50 is acceptable on any order. Hitherto they have held firm at \$20 base, but falling off in sales in two weeks have been so marked that to meet competition, the reduction is extended to tonnages of all sizes. Of the five producers here, all are interested in the New York vehicular tunnel with the exception of one. There is no disposition on the part of any interest, however, to quote beyond second quarter delivery. Some of the foundries interested in the tunnel proposition ask for bids on the basis of 100,000 tons. Total sales are about 5000 tons. Inquiry is scattered, including one for 1000 tons of No. 2 X and another of the same grade for 600 tons. Inquiry from outside the district is not as brisk as a month ago when foundries generally felt Buffalo iron was so weak that freight differentials could be overlooked.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$20.00 to \$20.50
No. 2X foundry, 2.25 to 2.75 sil.	19.50 to 20.00
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 19.50
Basic	18.25 to 18.50
Malleable	20.00 to 20.50
Lake Superior charcoal	31.75

Finished Iron and Steel.—Bar and shape demand has shown marked improvement and a steady demand is also evident in cold-finished material. Other materials are slow and commodities such as bolts, nuts, pipe and wire, which have been fairly firm in demand, are very slow. Bar quotations at less than 1.50c. are more often heard and one desirable inquiry brought out a reported quotation of 1.42½c. Quotations of this kind are for immediate acceptance only and are withdrawn if the order is not forthcoming the same day. Some indication of the rolling situation may be gained through the experience of a buyer who placed an order for 50 tons of plates with a mill with the understanding that rolling must start the same day and the order was taken on that basis. The Lackawanna Bridge Co., now operating as a subsidiary of the Lackawanna Steel Co., will fabricate 1400 tons of shapes for the new Ford hotel, Buffalo. A new hotel proposition in Syracuse involving 3500 tons is interesting local fabricators, but bids have not been asked. The Buffalo Steel Car Co. is working on 500 cars for the Lackawanna Railroad.

Warehouse Business.—Sheet and bar orders showed slight gain, but structural demand is quiet. Prices on shafting have been reduced. The lack of interest on the part of many regular warehouse customers which was attributed to the inventory period, has passed, and a wider circle of buyers lead to encouragement.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.40c.

Old Material.—A mill has bought several consignments of steel at \$13.50, but the aggregate of its purchases is far short of its needs. Dealers are firm in the decision not to release steel at this price and a \$14 price is likely to be the ruling quotation daily.

Inquiry from outside the district for turnings and borings comes to hand daily, but no business develops because of the low production in this district.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$13.00 to \$14.00
Low phosph., 0.04 and under.....	17.00 to 18.00
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels.....	16.50 to 17.50
Machine shop turnings.....	7.50 to 8.00
Cast iron borings.....	7.00 to 8.00
Heavy axle turnings.....	10.50 to 11.50
Grate bars.....	12.00 to 13.00
No. 1 bushing.....	10.00 to 11.00
Stove plate.....	15.00 to 16.00
Bundled sheet stampings.....	8.00 to 9.00
No. 1 machinery cast.....	17.00 to 18.00
Hydraulic compressed.....	10.50 to 11.50
Railroad malleable.....	13.00 to 14.00

Cincinnati

CINCINNATI, Jan. 24.

Pig Iron.—The market continues quiet. Although a slight increase in activity is to be noted, nothing approaching a buying movement has developed, and while some big inquiries are current in connection with the New York tunnel project, the trade as a whole is not very optimistic as to any of this business being placed so far West. One of these inquiries from a nearby melter calls for 20,000 tons. Other inquiries include one of 1000 tons from a local melter, 300 tons of low phosphorous from a Tennessee melter, and 100 tons from a central Ohio manufacturer. A Louisville melter is expected to buy 500 tons of foundry iron during the week, and a deal for 200 tons of charcoal iron will be closed to-day. Sales during the week were mostly of Southern iron in lots up to 100 tons, the prices ranging from \$15.60 to \$16, Birmingham, the former price being made by a furnace which has a slight freight advantage over Birmingham. The Southern market is weak at \$16, and it is said that a desirable tonnage might be placed at less, though on business offered Alabama furnaces have not quoted lower than \$16. In the North Chicago and lake furnaces iron is said to be available at \$18.50, and this price has been quoted. Southern Ohio furnaces are quoting \$19.50 to \$20, and have booked some orders at these figures. The minimum figure is being quoted in competitive territory, and it is said furnaces in the Ironton district have no disposition to shade this figure.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	21.00
Ohio silvery, 8 per cent sil.	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.02
Basic, Northern	22.02
Malleable	22.52

Finished Material.—A Southern railroad has bought 400 tons of steel bars at 1.50c., Pittsburgh. The same road is also reported to have placed approximately 3500 tons of splice bars with an unnamed producer. With these exceptions, orders for finished materials during the week were rather light, although an order for 300 tons of wire products was placed by a manufacturer in this district. A local fabricator is figuring on two oil storage tanks in the Southwest which will take approximately 1000 tons of plates. Inquiries for the most part are confined to carload lots, although in some instances 100 tons are asked for. The market on the whole is not showing the activity that was expected, though bookings are showing a gradual increase. No price changes are reported on business done in this district, bars, shapes and plates still being quoted at 1.50c., Pittsburgh, and black and galvanized sheets at 3c. and 4c. respectively. While reports are current of lower prices on wire nails, this may be accounted for by a number of mills which are quoting \$2.50 per keg at mill. There has been little new activity in the structural field. The Columbus, Ohio, board of education is getting bids on a high school which will take 200 tons. The U. S. Engineer's office, Louisville, Ky., will close bids on Feb. 17 for furnishing and delivering a steel maneuver boat hull for dam No. 48 on the Ohio River. The American Creosoting Co., Louisville, Ky., has placed 60 tons with the McClintic-Marshall Co. for a building at New Haven, Conn. This is the only

award reported in this district for last week. The structural steel for the Gibson Hotel addition will probably be let this week. A number of projects are taking more definite shape, including an addition to the Business Men's Club in Cincinnati and a building for the Chamber of Commerce. The Queen City Club is also expected to erect a new club house, work to begin early in the spring. A number of reinforced concrete projects are also expected to develop shortly. Bids will close on Feb. 23 for a \$500,000 high school at Middletown, Ohio, and the contract has been awarded for a \$200,000 building for the Home of the Friendless at Cincinnati.

Warehouse Business.—Warehouse sales show a slight improvement, although orders are for the most part small and for immediate delivery. Some business developed in cold rolled products, mostly from automobile accessory manufacturers. No further price changes are reported.

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.00 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Coke.—The spot market on coke is showing only fair activity, but there has been some contracting for the year's requirements. Prices are unchanged, Connellsville foundry coke being quoted at \$3.75 to \$4.25, Wise County foundry \$5 to \$5.50, New River \$7 to \$7.50, and by-product fuel at \$6, Connellsville basis.

Old Material.—There is very little movement in scrap materials, and the market is inclined to weakness. Very little material is coming out, but dealers' yards are pretty well stocked against the time when improved demand sets in. While prices are softer, quotations are unchanged in the absence of trading.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets.....	\$3.50 to \$4.00
Iron rails.....	12.00 to 12.50
Relaying rails, 60 lb. and up.....	25.00 to 26.00
Retrolling steel rails.....	10.50 to 11.00
Heavy melting steel.....	9.00 to 9.50
Steel rails for melting.....	9.00 to 9.50
Car wheels.....	12.00 to 13.00

Per Net Ton	
No. 1 railroad wrought.....	8.50 to 9.50
Cast borings.....	3.00 to 3.50
Steel turnings.....	2.00 to 2.50
Railroad cast.....	12.00 to 12.50
No. 1 machinery.....	13.50 to 14.50
Burnt scrap.....	7.50 to 8.00
Iron axles.....	15.50 to 16.50
Locomotive tires (smooth inside)....	9.50 to 10.00
Pipes and flues.....	4.00 to 4.50

Birmingham

BIRMINGHAM, ALA., Jan. 24.

Pig Iron.—Third week of January was more nearly satisfactory than its two predecessors. The Birmingham market resisted effort at forcing lower prices and hardened at \$16. Many firm offers of \$15.50, which were declined, came back for booking at \$16. At the close of the week, the \$16 base was seemingly entrenched. One maker did a very good business in small tonnages scattered over the South, Middle West and Southwest with some in the East. Lots of 100 tons were placed in Michigan, Ohio, Indiana and Baltimore territory. Total bookings of one company were around 1500 tons. Silicons are strictly maintained both above and below base, a lot of high silicon selling at \$18.50. Pipe makers are not in the market owing to the slowness of new business to develop. Makers report moving of the make and one maker is moving more than make. Practically all business is for prompt movement. Larger machine shop operators have been very little in the market for many months and are still seldom heard from.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$16.00
Basic.....	15.00
Charcoal, warm blast.....	32.00

Cast Iron Pipe.—Sanitary and high pressure pipe markets report little new business. The leading interest is shipping 1000 tons to the Pacific Coast following more than 5000 tons from several shops in Decem-

ber. This goes by Mobile at one-half the rail rate. The McWane Cast Iron Pipe Co. will soon ship special high pressure pipe makes to Honolulu. The sanitary base is \$37 for standard. High pressure base is nominal at \$33.

Finishing Mills.—The Tennessee company has only one idle finishing mill this week. All except the plate mill at Fairfield are in operation, the structural mill resuming Monday. The Bessemer plate mill is operating. It is presumed that the Ensley rail mill will get the greater part of the 85,000 tons of rails to be placed by the Southern Railway, in which case its known bookings for this year will carry the plan well beyond the first half at a steady pace of 6000 tons a week. Wire mills report greater interest in nails and wire. Sheet steel is continuously active.

Coal and Coke.—The Barrett Co. is turning out 100 tons of pitch coke per day in the leased beehive ovens of the Republic Iron & Steel Co. It is regularly entrenched in the foundry trade. Base is \$8. It is 98 per cent carbon. Other cokes are ruling at \$5.25 to \$5.50.

Old Material.—Scrap dealers report very little activity following temporary withdrawals of demand from pipe shops. Prices remain rather firm than not.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails.....	\$11.00 to \$12.00
No. 1 steel.....	10.00 to 11.00
No. 1 cast.....	14.00 to 15.00
Car wheels.....	13.00 to 14.00
Tramcar wheels.....	12.00 to 13.00
No. 1 wrought.....	12.00 to 13.00
Stove plate.....	11.00 to 12.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	6.00 to 7.00

Cleveland

CLEVELAND, Jan. 24.

Iron Ore.—Ore firms do not look for any activity in the ore market before May. General conditions in the trade are about the same as a year ago, although the outlook is better in one respect in that while at this time last year ore consumption was declining from month to month, it is now on the increase. A canvass of many consumers indicates that on the average furnace companies with present operations have about enough ore to last them until August. Furnaces are showing more interest in the freight rates than in ore prices. Nobody is attempting to make an accurate guess on probable prices for the season because ore prices this year will depend to a considerable extent on what, if any, action is taken by the Interstate Commerce Commission in making a general reduction in rail rates. Lower rail rates on coal and other supplies will reduce mining costs as well as the cost of shipping ore from the mines to the upper lake ports, this rail charge being figured in the price of ore, which is sold f.o.b. lower lake port. It is stated that blast furnaces are showing less interest this year than a year ago in trying to obtain information as to probable prices to be used in preparing their inventories, as few made a profit during the past year and consequently do not feel the need of showing losses on ore inventories to offset against profits in income tax returns.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.50.

Pig Iron.—Interest during the week centered on numerous inquiries from foundries that are planning to bid on the segments for the New York vehicular tunnel. These inquiries ranged from 25,000 to 60,000 tons and came from foundries in the East, the Pittsburgh territory, and as far west as Cleveland. However, the feeling here is that Eastern foundries have the best chance of getting the business. The inquiries are for both No. 2 and No. 3 iron. Furnaces and prospective purchasers seem unable to agree on any selling arrangement mutually satisfactory. Foundries want a fixed price for a period of about 15 months, objecting to paying market prices at time of shipment, as that would not permit them to figure their costs. Furnaces, on the other hand, generally are not inclined to sell at a fixed price for longer than a three months' period.

One was asked to quote a flat price for delivery through the present year, but declined. The market was rather quiet in actual sales during the week. Two or three Ohio consumers placed 500-ton lots of foundry iron with a Cleveland furnace at \$19 to \$20 for No. 2 for the first quarter's delivery and another lake furnace reports a number of small lot sales of foundry iron aggregating 1000 tons at the same range in prices, the price depending on delivery point. A sale to a Cleveland consumer is reported at \$20.50 at furnace. Some business was taken by a western Pennsylvania furnace on the basis of \$19, Valley, for foundry iron, or 50c. below the price regularly quoted by furnaces located in the Valley district. A few small lot sales of Southern iron were made on the basis of \$16 for 1.75 to 2.25 per cent silicon iron.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.26 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Base.....	\$20.21 to \$20.71
Northern No. 2 fdy., sil. 1.75 to 2.25.....	19.00 to 20.00
Southern fdy., sil. 1.75 to 2.25.....	22.67
Ohio silvery, sil. 8 per cent.....	32.86
Standard low phos. Valley furnace.....	33.00

Wire Products.—The arbitrary differential announced last week on basic and Bessemer wire for Cleveland delivery in place of the freight rate from Pittsburgh, has been extended by the American Steel & Wire Co. to cover nails, but so far has not been applied to the other products of this company's Cleveland plants. The differential is 10c. per 100 lb. and means the equalizing of the freight rate from Youngstown or the absorbing by the mill of practically half the freight rate from Pittsburgh. The customer will be charged the Pittsburgh base price plus 10c. per 100 lb. instead of the present Pittsburgh-Cleveland freight rate of 21c. per 100 lb. as figured on the combination short haul basis. It should be noted that these prices, which are for both jobbers and manufacturers, are for Cleveland delivery only. Orders from outside of Cleveland placed directly with the mill or through a Cleveland jobbing house for direct mill shipment to an out-of-town customer, will carry the usual Pittsburgh price, plus the freight from Pittsburgh to destination.

Sheets.—The demand for sheets has broadened materially, increasing the number of orders, which are all for small lots. The Detroit automobile manufacturers have withheld purchases this month until they received reports of sales from some of the automobile shows, but more activity is expected from this source during the week. Prices are being firmly maintained.

Semi-Finished Steel.—The market is very dull and prices are not clearly defined. While \$29 is the usual quotation, the belief is general that both sheet bars and slabs can be bought at around \$28.

Finished Material.—Orders for finished steel have improved somewhat and inquiries are more plentiful, but buying is only in small lots. Prices seem to be generally maintained at 1.50c. for steel bars, plates and structural material, although in some cases these prices have been shaded \$1 to \$2 a ton. Some of the smaller plate mills have been adhering to 1.60c., but at least one of these has been forced down to the 1.50c. price. However, sales of boiler plate are still being made at 1.60c. No new developments have appeared in the lake shipbuilding industry, although lake shipyards have quotations out on one or two freight boats. Little activity has appeared so far this year in structural work in this territory. The new building for the Union Trust Co., Cleveland, will require 1000 tons of sheet steel piling, which will be placed shortly, provided the bank goes ahead this year with the erection of its building. Steel for the building was placed and fabricated last year, but construction was postponed until building costs went down. The bank is now asking for bids for the general contract and if prices are satisfactory, the work will go ahead. Ohio fabricators are preparing to bid on the Union Station, Chicago, requiring 16,000 tons of steel, and a bridge across the Missouri River at Booneville, Mo., requiring 2000 tons. The outlook in the agricultural implement industry is not prom-

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Prices Finished Iron and Steel, f. o. b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	\$0.36	Kansas City	\$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2 1/4c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, 1/4 in. and heavier, tank quality, 1.50c.

Wire Products

Wire nails, \$2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.15; galvanized fence staples, \$3.15; painted barbed wire, \$2.65; polished fence staples, \$2.65; cement-coated nails, per count keg, \$2.00; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 80 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70 1/2 per cent off list for carload lots; 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7 1/2 per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, 1/2 in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads, 65 and 10 to 70 per cent off list
Longer and larger sizes, 65 and 10 to 70 per cent off list
Lag bolts, 70 and 10 to 70, 10 and 5 per cent off list
Flange bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list
Other style heads, 20 per cent extra
Machine bolts, c.p.c. and t. nuts, 1/2 in. x 4 in.:
Smaller and shorter, 65 and 5 per cent off list
Larger and longer sizes, 65 per cent off list
Hot pressed sq. or hex. blank nuts, \$5.60 off list
Hot pressed nuts, tapped, \$5.00 to \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped, \$5.00 off list
Semi-finished hex. nuts:
1/4 in. to 9/16 in. inclusive, 80, 10 and 10 per cent off list
Small sizes S. A. E., 80, 10, 10 and 10 per cent off list
1/2 in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages, 80, 10 and 5 per cent off list
Stove bolts in bulk, 80, 10 and 7 1/2 per cent off list
Tire bolts, 65, 10 and 10 per cent off list
Track bolts, carloads, 8c. to 3.25c. base
Track bolts, less than carloads, 1c. to 4.25c.

Upset Square and Hex. Head Cap Screws

1/4 in. and under, 80 and 10 per cent off list
5/16 in. to 1/2 in., 80 and 10 per cent off list

Upset Set Screws

1/4 in. and under, 80, 10 and 5 to 85 per cent off list
5/16 in. to 1/2 in., 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 per cent off list

Milled Set Screws

All sizes, 70 1/2 and 10 per cent off list

Rivets

Large structural and ship rivets, \$2.35
Large boiler rivets, 2.35
Small rivets, 70, 10 and 10 to 70, 10, 10 and 5 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$38; chain rods, \$36 to \$38; screw stock rods, \$41 to \$43; rivet and bolt rods and other rods of that character, \$36 to \$38; high carbon rods, \$43 to \$50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.15 to \$2.30 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 5/8-in. and 7/16-in., \$2.25 to \$2.30 base; 5/16-in., \$2.35 to \$2.30 base. Boat and barge spikes, \$2.25 to \$2.30 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c. to 3.25c. base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, 1 C., \$9.60; 15-lb. coating, 1 C., \$11.80; 20-lb. coating, 1 C., \$13; 25-lb. coating, 1 C., \$14.25; 30-lb. coating, 1 C., \$15.25; 35-lb. coating, 1 C., \$16.25; 40-lb. coating, 1 C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	54 1/2	28	1/4 to 1/2	36 1/2	18 1/2
1/2 to 3/4	60	33 1/2	1/2	42 1/2	27 1/2
3/4	65	50 1/2	3/4	44 1/2	29 1/2
1	69	56 1/2	1 to 1 1/2	44 1/2	29 1/2
1 to 3	71	58 1/2			

Lap Weld

Inches	Black	Galv.	Inches	Black	Galv.
2	64	51 1/2	2	39 1/2	25 1/2
2 1/2 to 6	68	55 1/2	2 1/2 to 6	42 1/2	29 1/2
7 to 8	66	61 1/2	7 to 12	40 1/2	27 1/2
9 to 12	64	60 1/2			

Butt Weld, extra strong, plain ends

Inches	Black	Galv.	Inches	Black	Galv.
1/4	50 1/2	33	1/4 to 1/2	35 1/2	23 1/2
1/2 to 3/4	56	38 1/2	1/2	42 1/2	28 1/2
3/4	62	50 1/2	3/4	44 1/2	30 1/2
1	67	55 1/2	1 to 1 1/2	44 1/2	30 1/2
1 to 1 1/2	69	57 1/2			
2 to 3	70	58 1/2			

Lap Weld, extra strong, plain ends

Inches	Black	Galv.	Inches	Black	Galv.
2	62	50 1/2	2	40 1/2	27 1/2
2 1/2 to 4	66	54 1/2	2 1/2 to 4	42 1/2	31 1/2
4 1/2 to 6	65	53 1/2	4 1/2 to 6	42 1/2	30 1/2
7 to 8	61	47 1/2	7 to 8	35 1/2	23 1/2
9 to 12	55	41 1/2	9 to 12	30 1/2	18 1/2

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		Charcoal Iron	
Inches	Discount	Inches	Discount
1 1/2 in.	26 1/2	1 1/2 in.	15
2 to 2 1/2 in.	41	2 to 2 1/2 in.	25
2 1/2 to 3 in.	52	2 1/2 to 3 in.	30
3 1/2 to 3 in.	57	3 1/2 to 4 1/2 in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed		Cents per Lb.	
No.	Discount	No.	Discount
No. 8 and heavier	2.20	No. 11 and 12	2.30
No. 9 and 10 (base)	2.25	No. 13 and 14	2.35
		No. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
No. 17 to 21	2.80	No. 28 (base)	3.00
No. 22 to 24	2.85	No. 29	3.10
No. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
No. 10 and 11	3.00	No. 25 and 26	3.70
No. 12 to 14	3.10	No. 27	3.85
No. 15 and 16	3.25	No. 28 (base)	4.00
No. 17 to 21	3.40	No. 29	4.25
No. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
No.	Discount	No.	Discount
No. 15 and 16	2.80	No. 28 (base)	2.90
No. 17 to 21	2.85	No. 29	3.05
No. 22 to 24	2.90	No. 30	3.25
No. 25 to 27	2.95	No. 31 and 32	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York*		Straits Tin		Lead		Zinc	
	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis	
Jan. 18.....	13.87½	13.62½	32.87½	4.70	4.40	5.07½	4.72½	
19.....	13.75	13.50	32.25	4.70	4.40	5.05	4.70	
20.....	13.75	13.50	32.12½	4.70	4.40	5.03½	4.67½	
21.....	13.75	13.50	.....	4.70	4.40	5.00	4.65	
22.....	13.75	13.50	31.50	4.70	4.40	5.00	4.65	
23.....	13.75	13.50	31.25	4.70	4.40	5.00	4.65	
24.....	13.75	13.50	31.25	4.70	4.40	5.00	4.65	

*Refinery quotation.

New York

NEW YORK, Jan. 24.

There is no improvement in demand for most of the metals. Buying of copper is extremely light and quotations are lower. The tin market has been fairly active but prices dropped suddenly yesterday. Lead is the only market which maintains its strength. Demand for zinc could hardly be less and as a consequence prices have fallen off.

Copper.—Large consumers of copper remain out of the market, due largely to the heavy purchases which they made in the last quarter of last year. As a result the light demand is easily taken care of by large and small dealers and some small producers who are ready to meet bids under the market. As a result electrolytic copper is available from such sources at 13.50c., refinery, or 13.75c., delivered, for the first quarter, and at 13.87½c. or 14c., delivered, for second quarter, some light sales having been made at these prices for these positions. The market is entirely without feature. Lake copper is slightly lower at 13.75c., New York or delivered.

Tin.—The activity last Tuesday, Jan. 17, referred to in this market, details of which are now available, amounted to sales of 400 to 500 tons of Straits tin and was the most active day in the past week, dealers buying in good volume. On that day January metal sold at 32.12½c. This activity on the part of dealers continued until Jan. 21, the total sales, including those referred to, amounting to 800 to 900 tons. The feature of the present market is the premium on spot and January delivery, amounting in some cases to ½c. per lb. over futures. This is due either to a scarcity of metal or to the fact that prompt supplies are in strong hands. Yesterday the London market broke £4 per ton, but this had no effect in causing buyers to be interested, the market being stagnant. To-day the London market was only slightly below that of Monday, with spot standard selling at £158 10s., future standard at £160 and spot Straits at £160 10s., all about \$5 per ton below prices a week ago. Quotations for spot Straits tin here to-day were 31.25c., New York. A feature of the London market yesterday and Monday was the large volume of business, sales amounting those two days to 2390 tons, mostly futures. It is interesting to note that there are offerings now of Chinese tin here at low prices, Chinese sellers being eager to make transactions on the approach of the Chinese new year. Arrivals thus far this month have been 8565 tons, with 4935 tons reported afloat.

Lead.—There is no change in either demand or prices, both being steady with that of the leading interest at 4.70c., New York and St. Louis, and that of the independents at 4.40c., St. Louis, and 4.70c. to 4.75c., New York and Eastern points. Demand is reported good from battery and pigment interests and there is a good inquiry for future shipment.

Zinc.—This market is reported as quiet as at any time last summer, sales being few and far between and confined in most cases to carload lots to meet early needs of consumers. As a result prime Western for early delivery has declined to 4.65c., St. Louis, or 5c., New York, or a fall of ½c. per lb. in the past week. There are still those who feel that future conditions may result in some export shipment to England as the result of a possible scarcity there.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted at 4.45c. per lb., New York, duty paid.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, are quoted by the leading interest at 19c. to 19.10c. per lb. f.o.b. plant, depending on the quantity, while the same grade is offered by importers at 17.50c. to 18.50c., New York, duty paid.

Old Metals.—The market is very quiet. Holders are generally unwilling to sell at concessions, and consumers waiting to see what the new metal market will do. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.25
Copper, heavy and wire.....	12.50
Copper, light and bottoms.....	10.00
Heavy machine composition.....	10.25
Brass, heavy.....	8.00
Brass, light.....	6.00
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy.....	4.25
Lead, tea.....	3.25
Zinc.....	3.00

Chicago

JAN. 24.—While there has been no particular pressure to sell, such sales as have been made have been at concessions. In the virgin metals declines are recorded in copper, tin and spelter and most grades of old metals are lower. We quote in carload lots: Lake copper, 13.75c.; tin, 32.50c.; lead, 4.50c.; spelter, 4.75c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 5.75c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

JAN. 24.—The market for lead and zinc is unchanged. We quote lead at 4.40c., carlots, and slab zinc at 4.80c. On old metals prices are: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Warning as to Strike

WASHINGTON, Jan. 24.—Warning sounded last week by Secretary Hoover that a coal strike of bituminous miners now seems likely, was made as a suggestion to industrial and other consumers so that they may be given opportunity to lay in a stock of supplies for use during the strike, if it occurs. Wage agreements with operators expire on April 1, and producers have announced that a reduction in wages is necessary. Vigorous opposition is being made by operators. Anthracite miners at the same time are asking for a 20 per cent increase in wages. It remains to be seen whether consumers of soft coal will stock up. One discouraging feature is the high freight rates and it is not expected that even if they are reduced as a result of the rate hearing now under way by the commission, the lower levels will become effective before April 1.

Mechanical Engineers' Activities

Germans may now apply for membership in the American Society of Mechanical Engineers. The council of the society at a meeting at Norfolk, Va., voted that hereafter there will be no discrimination among applicants because of citizenship, now that friendly relations have been resumed between the United States and nations with which it was recently at war.

A resolution was passed advising that the American Engineering Council make an investigation of a basis for wages in industry.

A committee has been appointed on research on riveted joints as follows: Allen D. Risteen, Sherwood F. Jeter, Alphonse A. Adler, Norman Slee and John F. Fairfield.

ROCHESTER SELECTED

American Foundrymen's Association Will Meet in That City, June 5

CHICAGO, Jan. 24.—C. E. Hoyt, secretary, announces that final arrangements have been made for holding the annual convention and exhibit of the American Foundrymen's Association and allied societies in Rochester, N. Y., the week of June 5, instead of in Cleveland as previously scheduled. This decision was reached following conferences on Jan. 18 and 19 with Mayor Kohler of Cleveland, at which time it was learned that due to the incomplete condition of the new public hall, uncertainty as to when it would be open to the public, and the manner in which it would be operated, it would be impossible for the city to give a lease for any specific date in 1922, and further, that because of these conditions the present administration could not honor the agreements which the previous administration had entered into with the foundrymen's association.

All the activities of the association will be centered at Exposition Park, Rochester's million dollar show place, located only a mile and a half from the center of the city. Comfortable and commodious assembly rooms for general and auxiliary meetings are available, while buildings Nos. 3, 4 and 5, all directly connected, afford better accommodations for all classes of exhibits than have been found in any other city where exhibits have been held. Rochester would have been first choice for two previous fall conventions had it been able to offer a greater number of hotel rooms.

For a June convention it has been possible for the Rochester citizens to increase their guarantees, and the committee feels certain that all members and guests can be comfortably taken care of. A plan is being worked out for handling all reservations through a hotel committee, to which each hotel has pledged a large quota of rooms. Reservation and application blanks with complete information will be issued as soon as the hotel committee is organized.

Results of Tariff Referendum

The Chamber of Commerce of the United States has announced the result of its referendum on the tariff. On the question of "reasonable protection for American industries," the affirmative vote was 1840 and the negative 27. On the creation of a tariff adjustment board to administer adjustable rates, the affirmative vote was 1379 and the negative 481. On maintaining the anti-dumping legislation, 1840 voted yes and 37 no. The chamber committee had recommended that the present system of valuation for levy of ad valorem duties should be maintained and stated that votes in opposition to this recommendation would be interpreted as in favor of American valuation. The vote was 979 yes and 833 no, but the vote in favor of the present system of valuation did not have a large enough majority to commit the chamber. On the question of postponing general tariff legislation until conditions in international trade and finance are sufficiently stabilized to form a basis for legislation possessing permanent value, 734 voted yes and 1110 no.

The committee on railroads of the Chamber of Commerce of the United States in its report to the board of directors, which is to be considered at the meeting of the National Council in Washington Feb. 8 and 9 recommends legislation authorizing the President to appoint and prescribe the compensation of a special administrative officer with the title Commissioner General of Transportation, whose duties it will be to promote and develop transportation facilities of the country in the light of the people's interest. It is not intended that the new officer is to take the place of the Interstate Commerce Commission, but he may conduct separate investigations to determine the facts as to pending matters.

FOREIGN RAILROADS BUY

Rails for Manchuria — Tin Plate, Wire Rods, Nails and Sheets for Japan

NEW YORK, Jan. 24.—Export inquiries during the past week have been largely dominated by foreign railroad buying. From the Far East, China continues to inquire for small lots of various kinds of material. A Japanese company is in the market for about 20,000 base boxes of oil size tin plate and there are a number of sheet inquiries active. M. W. Kellogg & Co., New York, who received the contract for fabricating the five pipe lines of 50-in. to 54-in. pipe for Formosa, has practically closed for the plate tonnage involved, about 2400 tons, all to be delivered in Formosa before Jan. 1, 1923.

The National Railways of Mexico are negotiating for the purchase of about \$300,000 worth of machine tools and the South Manchuria Railway Co. has issued an inquiry, closing the end of this month, for about 40 miles of 100-lb. rails, between 6000 and 7000 tons, with accessories. Bids are being obtained through exporters to the Far East, particularly Japanese export houses, but the South Manchuria Railway Co.'s office in New York may be made a buying office in the near future. Bids for furnishing this rail tonnage are also being received from British and Continental mills. German agents in this country were desirous of submitting bids, but the stipulation that delivery must be made in June, c.i.f. Dairen, Manchuria, prevented this competition. British sellers are reported to have quoted about £2 5s. under the American market price.

Among the active iron and steel items in Japanese inquiries are wire, wire rods, and wire nails. A fairly large tonnage of wire rods has been inquired for and several exporters have quoted on a total of several thousand kegs of nails. There is fairly steady buying of copper.

Brier Hill Steel Co.'s Heavy Loss

YOUNGSTOWN, OHIO, Jan. 24.—At the annual meeting of the Brier Hill Steel Co. to-day, stockholders were informed that the company sustained a total loss in 1921 of \$3,874,475, reducing its surplus as of the end of the year to \$17,652,032. James B. Kennedy, chairman of the board of directors, announced that the Brier Hill company has been engaging in merger discussions with six other independent interests and thought such a combination would prove a stabilizing influence. No report from the merger committees on valuation and plan of amalgamation has yet been made, it was stated. The past year was one of extremely adverse conditions, he said, but all economic indications point to nearby improvement. The company has little forward business on its books. The volume of business the past year was declared to be 38 per cent of capacity. The Brier Hill company has purchased an iron ore mine of 8,723,000 tons on the Mesabi range. Gross sales in 1921 of \$12,525,837 compare with \$44,222,219 in 1920. Payroll of \$4,695,000 was over 35 per cent of sales receipts last year. Production in 1921 was 203,545 tons and shipments 226,787 tons.

The company's repair account for the year totalled \$1,172,000. Among items that contributed to surplus reduction were a loss of \$1,172,574 encountered in conduct of business; writing down inventory \$758,367; depreciation \$761,939; shutdowns \$773,128. Dividend payments during year aggregated \$648,986. An estimated saving of about \$500,000 was made by operating properties rather than suspending, said the chairman, and in addition plants are in improved condition. The company has maintained quoted prices even to the extent of losing business, and any price cutting was to meet competition, it was declared. Directors and officers were re-elected.

Membership in the American Electro Chemical Society on Jan. 1 totaled 2354. In 1921 there were 140 new members accepted and 150 old members dropped, resigned or died. The membership on Jan. 1, 1921, was 2364 making a net loss of 10 last year.

PERSONAL

B. G. Roos, chief engineer in charge of passenger car design for the Pierce-Arrow Motor Car Co., Buffalo, has resigned to become connected with the Locomobile Co. of America, Bridgeport, Conn., in a like capacity. He will succeed A. L. Riker, who has been chief engineer for many years and who becomes a member of the board of directors.

At the annual meeting of the Victor Tool Co., Waynesboro, Pa., Jan. 12, H. C. Geist was re-elected president; Frank Barnett, vice-president; and R. G. Mumma, secretary. John Warehime has been succeeded as treasurer by J. G. Mumma, connected with the Landis Machine Co., but will remain on the board of directors. J. G. Mumma, S. F. Newman and Crawford Kirkpatrick are new members of the board of directors, all being connected with the Landis Machine Co.

George C. Mills, for the past 17 years affiliated with Naylor & Co., New York, most of that time as Pittsburgh district sales manager, has become associated with the recently organized firm of Lippincott Mills & Co., Inc., New York and Cleveland, as Pittsburgh resident manager, with offices at 976 Union Arcade, Pittsburgh.

Kenneth Seaver, who has been identified with the Harbison-Walker Refractories Co., Pittsburgh, for the past 19 years, latterly in the capacity of assistant general manager of sales, has been promoted to the position of general manager of sales, succeeding Judd J. Brooks, Jr., who has been appointed to the position of assistant to the president. Mr. Seaver graduated with the degree of civil engineer from the Massachusetts Institute of Technology and before joining the Harbison-Walker company, was with the Pennsylvania and Baltimore & Ohio railroads and also for a short time with the American Bridge Co.

G. E. Wilson, formerly of Toledo, has been appointed general manager of the Milan Machine & Tool Co., Milan, Mich.

H. M. Lee has been elected president and general manager of the Duplex Truck Co., Lansing, Mich.

Earl L. Smitherman, well known in Detroit as a foundry manager and plant superintendent for several large companies, has become associated with the Great Lakes Distributing Co., Detroit, and will have charge of sand and fire brick sales.

Franklin G. Smith, president Osborn Mfg. Co., Cleveland, sailed from New York Jan. 18, on a two or three months business trip abroad. He will visit England, France, Germany and Belgium.

A. M. D. Martin has resigned from the position of assistant general manager of the Adria Motor Car Corporation, Batavia, N. Y.

John E. Schindler of the Garden City Foundry Co., Chicago, has been elected president of the Chicago Foundrymen's Club for 1922. George E. Carlin of the United Boiler & Foundry Co., Hammond, Ind., was elected vice-president, and George H. Manlove, Penton Publishing Co., was re-elected secretary-treasurer. Retiring directors were re-elected for two years.

O. A. Brock, advertising manager of the Keystone Steel & Wire Co., Peoria, Ill., has been elected president of the Peoria-Chillicothe Electric Railway Co.

J. R. Stroh, manager of the mining and transportation departments of the Brier Hill Steel Co., Youngstown, Ohio, resumed his duties last week after a month's illness.

G. B. LeVan has severed his connection as vice-president and general manager of the La Belle Iron Works and plans to spend several months with his family in Florida.

L. E. Salom has been appointed district representative in New York for the Cleveland electric tramrail

division of the Cleveland Crane & Engineering Co., with headquarters at 50 Church Street, New York.

W. D. Blatz has been appointed general sales manager of the Bridgeport Brass Co. He joined the marketing organization of the Bridgeport Brass Co. in 1915.

T. J. Dillon was recently elected president and general manager of the Abendroth Brothers, Port Chester, N. Y., representing new interests which have taken over that plant. This concern was established in 1840 and makes soil pipe and fittings, gas ranges and heaters.

Alexander Glass, chairman Wheeling Steel Corporation, accompanied by Mrs. Glass, is at Winter Park, Fla., for a brief vacation.

Frank A. Weidman, for the past twelve years affiliated with the American Sheet & Tin Plate Co., in the special agent's department at Pittsburgh, has joined the Inland Steel Co., Chicago, as special representative.

S. H. Farkas has resigned as vice-president and director of the Exeter Machine Works, Inc., West Pittston, Pa.

C. B. Wilson, for several years engaged as pig iron salesman for Rogers, Brown & Co., New York, has accepted a similar position with Reed, Fears & Miller, New York.

OBITUARY

JOSEPH T. SLINGSBY, president Aborn Steel Co., 22 Clarke Street, New York, died by accident, Jan. 22. Mr. Slingsby was a resident of Rutherford, N. J. He was born in 1881 at Riverside, a suburb of Providence, R. I. He became connected with the Midvale Steel & Ordnance Co., in New York and in 1915 resigned to organize his own company, the Aborn Steel Co., representing the Century Steel Co. and the Ontario Electric Steel Co., both of Poughkeepsie, N. Y. He was New York representative of the Standard Gage Steel Co., Beaver Falls, Pa., and the United Alloy Steel Corporation, Canton, Ohio. Mr. Slingsby was a Mason and from 1920 to 1921 was president of the National League of Masonic Clubs.

THOMAS CLARK DILL, whose sudden death at 56 years of age on Jan. 6 was noted last week, will be succeeded as president of the T. C. Dill Machine Co., Inc., Philadelphia, by his widow, Mrs. Matilda J. Dill. A daughter, Mrs. Matilda Dill Moore, has been the company's secretary for several years. Mr. Dill was best known through the slotter which bears his name, but prior to patenting the slotter, he had manufactured and marketed a connecting rod patent. The business was established in 1888.

CHRISTOPHER MINER SPENCER, Hartford, Conn., inventor of the Spencer repeating rifle and the first automatic screw machine, died at the home of his son, Roger M. Spencer, Hartford, Jan. 14, after a very brief illness. Mr. Spencer had been sick only a few days, suffering from a general breakdown due to a cold. He was 88 years old, and was active in his work right up until his illness. Mr. Spencer was one of America's best-known inventors. Burial was in Windsor, Conn.

ARCHIBALD A. HUTCHINSON, who died on Jan. 19 at his home in Englewood, N. J., in his eightieth year, was one of the pioneer operators in the coke districts of western Pennsylvania. He owned the Standard and the Globe coal mines, and at the time of disposing of his interests to H. C. Frick in 1883 had 220 beehive ovens. He leaves his wife, a son and a daughter.

JOHN GOERGEN, founder of the Goergen-Machwirth Co., sheet metal contractor, Buffalo, N. Y., died Friday, Jan. 20. He was born in Germany and went to Buffalo 31 years ago.

HARRY ASA GRAMMES senior member L. F. Grammes & Sons, Allentown, Pa., died on Jan. 16.

Iron and Steel Markets

(Continued from page 303)

ising. With the irregularity in soft steel bars, hard steel reinforcing bars have settled down to a 1.40c. price and this possibly could be shaded. Hot-rolled strip steel in the wider sections and heavier gages that compete with steel bars are quoted as low as 1.85c. While the 3.50c. price on cold-rolled strip steel seems to be maintained, some mills are reported to be waiving extras on this material.

Jobbers quote steel bars, 2.36c.; plates and structural shapes, 2.16c.; No. 9 galvanized wire, 3.25c.; No. 9 annealed wire, 2.75c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Bolts, Nuts and Rivets.—The improvement in the demand for bolts and nuts noted last week continues, but buying is mostly in small lots. However, a few fair sized orders have been placed by automobile manufacturers. Prices appear to be fairly firm, local makers showing no disposition to go below regular quotations. The demand for rivets has quieted down after a little spurt of buying, but makers are getting some small lot inquiries. The market is not firm, some makers shading from \$1 to \$2 a ton the regular price of 2.25c., Pittsburgh, for structural and 2.35c. for boiler rivets.

Coke.—The demand for foundry coke in small lots continues fairly active as some foundries are either stocking up or placing orders for February shipment. A possibility of a coal strike has caused many foundries to stock up on coke. Prices are unchanged at \$4 to \$4.25 for standard Connellsville foundry cokes.

Old Material.—A Cleveland mill during the past few days purchased 7500 tons of machine shop turnings for a blast furnace at \$8 per ton. Orders for this material went to Cleveland dealers, but it is understood that most of the scrap will come from Detroit. There was also some activity during the week for machine shop turnings for Youngstown shipment, sales to dealers being reported at around \$9.75, Youngstown. Outside of machine shop turnings, the market was quiet during the week, but prices are firm. Dealers report some scarcity of turnings, but expect that the supply of this material will become plentiful now that the Detroit automobile manufacturers have increased operations.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	\$12.00 to \$12.50
Steel rails, under 3 ft.	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	12.00 to 12.50
Cast borings	8.60 to 9.00
Machine shop turnings	8.00 to 8.25
Mixed borings and short turnings	8.60 to 9.00
Compressed steel	9.00 to 9.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	7.50 to 8.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Blast Furnace Activities

PITTSBURGH, Jan. 24.—The Jones & Laughlin Steel Co. yesterday put on the blast at one of its Eliza furnaces and now has six of its 12 furnaces making iron, three being in blast at its Woodlawn, Pa., works. It is probable that one of the two idle furnaces at the latter works will be blown in this week, at first on pig iron but later on ferromanganese. The American Steel & Wire Co. has one of its stacks at Donora, Pa., down for relining, but is making iron in the other Donora furnace and also in its two stacks at the Schoenberger works, Pittsburgh. Of the 140 merchant and steel works furnaces in the territory bounded by Johnstown, Pa., Portsmouth, Ohio, and Warren, Ohio, 52 now are making iron. This is the same number as a month ago, the starting up of one of the Jones & Laughlin Steel Co. furnaces and of the Trumbull-Cliffs furnace at Warren, Ohio, being offset by the blowing out of one Donora furnace and the banking of one Pittsburgh Steel Co. stack.

British Iron and Steel Market

England Selling Pig Iron to Continent - More
Furnaces Blowing—Steel Position
Gradually Improving
(By Cable)

LONDON, ENGLAND, Jan. 24.

Realizing that further early price concessions are improbable, pig iron consumers are placing orders. Sales have been made to both Scandinavia and Germany. Two more Cleveland furnaces have been put in blast. Hematite demand is moderate, with prices weakening; one additional furnace is operating.

Foreign ore is quiet. Bilbao Rubio is quoted at 26½s. (\$5.59) c.i.f. Tees. Durham coke is priced at 26½s. (\$5.59) delivered.

After twelve months of inactivity, the Lanarkshire Steel Co. is re-opening. Steel demand generally is improved, but orders are still inadequate fully to employ the plants.

Ship repairers are well occupied. Scottish makers of bar iron have reduced export extras 50 per cent.

Sambre Moselle has secured orders from the Argentine for 45,000 tons of rails.

Belgian merchant bars are quoted at £8 (1.51c. per lb.) f.o.b., for April and May delivery. German merchant bars are held at £7 17½s. to £8 (1.49 to 1.51c. per lb.) f.o.b., for April and May shipments. Luxembourg merchant bars are quoted at £7 10s. to £7 17½s. (1.41 to 1.49c. per lb.) f.o.b., for March, April and May delivery. French merchant bars are held at £8 to £8 15s. (1.51 to 1.65c. per lb.) f.o.b., for April and May shipments.

Belgian wire rods are quoted at £8 15s. (\$36.92) f.o.b., for April and May delivery. Belgian angles are quoted at £7 12½s. (1.44c. per lb.) f.o.b., for March and April shipment.

Tin plate is easier under the stimulus of cheaper steel. February and March positions are being sold at 19s. (\$4.01) basis, f.o.b., but the works generally are holding out for 19½s. (\$4.06) basis, f.o.b. Oil plate consumers are reported covered to the end of April. The home trade is taking small quantities of odd sizes.

Galvanized sheets are weak. Business is done below £16 (3.01c. per lb.) f.o.b. Some makers are asking up to £16 5s. (3.06c.) per lb.

Welsh works have sold black sheets, to Japanese specifications, at £16 10s. (3.11c. per lb.) f.o.b. France is buying fair quantities of C A sheets, down to £12 10s. (2.35c. per lb.) f.o.b., being accepted.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.22 per £1 as follows:

Durham coke, delivered	£1 5s. to £1 7s.	\$5.28 to \$5.70
Cleveland No. 1 foundry	4 15	20.05
Cleveland No. 3 foundry	4 10	18.99
Cleveland No. 4 foundry	4 7½	18.46
Cleveland No. 4 forge	4 10	18.99
Hematite	7 0*	29.54*
East Coast mixed	4 15 to 4 17½	20.05 to 20.57
Ferromanganese	15 0 & 14 10*	62.30 & 61.19*
Rails, 60 lb. and up	8 0 to 9 10	33.76 to 40.09
Billets	7 0 to 7 10	29.54 to 31.65
Sheet and tin plate bars, Welsh	7 5 to 7 7½	30.80 to 31.12
Tin plate, base box	0 19 to 0 19½	4.01 to 4.17
C. per Lb.		
Ship plates	9 0 to 10 10	1.70 to 1.98
Boiler plates	12 10 to 14 0	2.35 to 2.64
Tees	9 10 to 11 0	1.79 to 2.07
Channels	8 15 to 10 5	1.65 to 1.93
Beams	8 5 to 10 0	1.55 to 1.83
Round bars, ¾ to 3 in.	10 10	1.98
Galvanized sheets, 24 g.	16 0 to 16 5	3.01 to 3.06
Black sheets	13 0	2.45
Steel hoops	12 0 & 12 5*	2.26 & 2.31*
Cold rolled steel strip, 30 g.	24 5	4.57

*Export price.

IRON AND INDUSTRIAL STOCKS

Erratic Price Movements of Steel Shares Attract Attention

The erratic price movements of some of the steel shares have attracted attention. Nothing has developed in the market for steel mill products or is likely to develop within the near future to warrant such advancing prices and subsequent declines in values as have been noted of late. But investing sentiment, like going business, moves up and down in turn. Fundamental industrial and money conditions continue to mend, although slowly. In the mean time shortages in many lines of commodities are more and more apparent, although they do not show on the surface because of the quietness of general business. That condition is becoming apparent in the raw wool market, and even with our large visible supplies the price of wheat responds quickly when buying appears. There are some evidences of shortages in sugar also. It is only fair to assume shortages in steel products, leather products and in a great many other lines exist.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal. com...	39 3/4-45	Lack. Steel	46 1/2-50
Allis-Chal. pf....	90-92	Midvale Steel ..	30 1/4-32 3/4
Am. Can. com...	33 3/4-34 3/4	Nat. Acme	11 1/2-13 1/2
Am. Can. pf.....	96-97 1/2	Nat. E. & S. com.	31 1/4-37 1/2
Am. C. & F. com...	146-148	Nat. E. & S. pf ..	82 1/2-89
Am. C. & F. pf...	118-118 1/2	N. Y. Air Brake	60 1/2-61 1/2
Am. Loco. com...	105-108 1/2	Nova Scotia Steel	24 1/2-28 1/2
Am. Loco. pf....	115-115 1/2	Press. Steel com	64-66
Am. Rad. com...	83-83 1/2	Press. Steel pf...	92 1/2-93
Am. Stl. F. com...	32 1/2-33 1/2	Ry. Stl. S. com	96 1/2-100 1/2
Am. Stl. F. pf...	96 1/2-96 1/2	Replough Steel...	27 1/2-41
Bald. Loco. com...	95 1/2-98 1/2	Republic com ...	52 1/2-56 1/2
Bald. Loco. pf...	106-106 1/2	Republic pf.....	86-87 3/4
Beth. Steel com...	54-56 1/2	Sloss com.	37 1/2-44
Beth. Stl. Cl. B...	57 1/2-61 1/2	Sloss pf.....	74-75
Beth. Stl. 8% pf...	108 1/2-109	Superior Steel...	26 1/2-31 1/2
Chic. Pneu Tool...	61-62	Un. Alloy Steel...	26 1/2-29
Col. Fuel	24 1/2-29 3/4	U. S. Pipe com...	16 1/2-20
Cruc. Steel com...	57 1/2-65	U. S. Pipe pf....	51-59
Cruc. Steel pf...	80-84	U. S. Steel com...	83 1/2-88
Gen. Electric...	140-144 1/2	U. S. Steel pf...	116 1/2-118
Gt. N. Ore Cert...	31 1/2-32 1/2	Vanadium Steel...	31 1/2-37 1/2
Gulf States Steel	52 1/2-80 1/2	Va. I. C. & C...	87 1/2-94 1/2
Int. Har. com...	82 1/2-85 1/2	Westinghouse Elec.	50 1/2-51 1/2
Int. Har. pf....	108-110 1/2		

Industrial Finance

The annual report of the National Enameling & Stamping Co., which will be published about the middle of February, will show a deficit for the year ending Dec. 31, after dividends, of close to \$3,000,000. Earnings in 1920 after fixed charges were \$3,361,352, equal to \$17.07 a share on the \$15,591,800 common stock. Inventories at the close of 1920 were \$8,867,700. Part of the deficit to be shown this year will be the write-off for inventory depreciation. Dividends on the common stock have been passed by the St. Louis Coke & Chemical Co., which is largely owned by the National Enameling & Stamping Co.

The Louisville Sheet Steel Co., Louisville, Ohio, has been placed in the hands of Hubert C. Pontius, as receiver, as a result of bankruptcy proceedings brought by creditors in the Federal Court in Cleveland. It is stated that the liabilities are \$345,000 and the assets \$300,000.

George H. Williams has been appointed receiver of the Aetna Brass Mfg. Co., Cleveland, operating a brass foundry making automobile parts. The operation of the plant will be continued for the present.

The Deep Drawn Metal Corporation, 36 Church Street, New York, has filed notice of increase in capital from \$30,000 to \$100,000.

Creditors of the American Motors Corporation, Plainfield, N. J., have agreed to accept an offer of \$200,000 for the personal property of the company, tendered by the American Motors Reorganization Syndicate, represented by Conus F. Penney, Greenboro, N. C. An initial payment of \$25,000 has been made, and the remainder will be made on Feb. 1, March 15 and April 15, with amounts of \$60,000, \$85,000 and \$30,000, respectively.

The Endicott Forging & Mfg. Co., Endicott, N. Y., has filed notice of increase in capital from \$300,000 to \$500,000.

The Cribben & Sexton Co., 680 North Sacramento Boulevard, Chicago, manufacturer of stoves, ranges, etc., has filed notice of increase in capital from \$300,000 to \$1,300,000.

The Locke Insulator Mfg. Co., Victor, N. Y., has filed notice of dissolution.

The Wire Goods Co., Worcester, Mass., wire goods manufacturer, has increased the capital stock of the company from \$125,000 to \$1,000,000, same to be used mainly in taking over three large Western wire plants by the Wire Goods Co. The

three concerns are the Cassidy-Fairbanks Co., Chicago; Andrews Wire & Iron Works, Rockford, Ill., and the Andrews Wire Works, Ltd., Walford, Ontario, Canada. Reginald Washburn, president of the company, returned last week from the West, and it is expected to close all details at a stockholders' meeting to be held this week. The Wire Goods Co. was incorporated in 1882.

The Virginia Iron, Coal & Coke Co. has declared a dividend of 50 per cent on the common stock, payable in 5 per cent cumulative preferred stock on Feb. 15 to stock of record Feb. 1. At the conclusion of this operation the company will have outstanding \$10,000,000 of common stock, par \$100, and \$5,000,000 of cumulative preferred stocks, as well as \$3,523,000 of first mortgage 5 per cent bonds, due March 1, 1949.

Trade Changes

The American Brass & Aluminum Founders Co., Chicago, has filed notice of change of name to the American Castings Co.

An agreement has recently been reached between the East Jersey Pipe Co., New York, and the Ritter-Conley Co., Pittsburgh, whereby "Lock Bar" steel pipe, which has been exclusively controlled by the East Jersey Pipe Co. since its introduction into this country in 1905 and has been hitherto manufactured by the East Jersey Pipe Co. at its plant at Paterson, N. J., will be hereafter fabricated in the Pittsburgh district by the Ritter-Conley Co., at its Leetsdale plant. This will permit considerable saving in freight rates and economy in manufacturing. The sale of "Lock Bar" steel pipe will continue to be exclusively in the hands of the East Jersey Pipe Co.

C. F. Kettering, president of the Deleo Corporation and vice-president of the General Motors Corporation, has been elected a director of the Dayton (Ohio) Fan & Motor Co. The Dayton company reports it is operating at full capacity and has sufficient orders booked to keep it running full time for six months.

W. H. Stackhouse, manager of the Springfield plant of the French & Hecht organization, has been appointed general manager of the entire organization, with plants in Springfield, Ohio, and Davenport, Iowa. Mr. Stackhouse is one of the three principal partners in the company, which manufactures 75 per cent of the steel wheels used in the making of agricultural machinery in the United States and Canada. Mr. Stackhouse will in the future make his home in Davenport. H. J. Rober has been appointed as plant manager at Springfield.

C. D. Watson has retired as vice-president and director of the Sheet Metal Mfg. Co., Youngstown, Ohio, having disposed of his interest in the company to T. E. Farrell, president. He plans to re-engage in the jobbing of sheets. The sheet metal company was organized three years ago and has a warehouse in Youngstown.

Financial and industrial interests of Youngstown, Ohio, have formed the Youngstown Equipment Co., which has taken over, under lease, the car shops of the Erie railroad at Kent, Ohio. Following a period of idleness, the plant has been started. It employs 700 men when operating normally. William Wilkoff, president of the Youngstown Steel Car Co., heads the equipment company.

Sydney Player, Joseph N. Bethel, Richard S. Staples, Herbert S. Indge and Alfred E. Box have left the Taft-Peirce Mfg. Co., Woonsocket, R. I., machinery designer and builder, to become en bloc stockholders and executives in the reorganized Warren F. Fraser Co., Westboro, Mass. The Warren company which was incorporated in 1914, manufactures cylindrical grinding machinery, plain cylinder grinders of all types, special machine tools and metal products. The reorganized company is placing on the market a new automatic cylindrical grinder. The officials of the reorganized Warren F. Fraser Co. are as follows: Warren F. Fraser, president, a member of the American Society of Mechanical Engineers and inventor of the new Fraser automatic cylindrical grinder; Frank H. McEliskey, vice-president; Sidney Player, vice-president and general manager, for 10 years factory manager of the Newell Engineering Co., London, previous to his becoming production manager of the Taft-Peirce plant a year ago; Joseph N. Bethel, vice-president and sales manager, for 23 years with the Taft-Peirce Mfg. Co. in various capacities; Maurice J. Cashman, treasurer; Richard S. Staples, assistant treasurer and metallurgist; Herbert S. Indge, consulting engineer; Alfred E. Box, factory superintendent.

The Universe Corporation, 341 East Ohio Street, Chicago, Ill., expects to build its own refrigerators and do its own machine work. It has already arranged for all the equipment it will require for a period of about six months. The company is also preparing to manufacture mechanical refrigerators and cooling devices for office use.

IDEAL INDUSTRIAL RELATIONS

Milwaukee Declaration of Principles Protecting Both Labor and Capital

MILWAUKEE, WIS., Jan. 20.—Thirty-one industrial groups, including the Metal Trades and Founders' Association, Automotive Manufacturers' Association, Iron and Steel Fabricators' Society, Sheet Metal Manufacturers and Contractors' Association, Chandelier Manufacturers' Association, Brass Founders and others, are now embraced by the Milwaukee Employers' Council, which was organized late in 1920 and began functioning at the beginning of 1921. The first annual meeting, held Jan. 17, resulted in the election of the following officers:

President, Herman A. Wagner, president Wisconsin Bridge & Iron Co.; vice-president, Richard P. Tell, president and general manager National Brake & Electric Co.; treasurer, Harold H. Seaman, president Seaman Body Corporation; secretary and manager, Joseph McC. Bell, 288 East Water Street, Milwaukee.

With virtually every major industry in its membership, and a number of minor lines of manufacturing and employment classes in Milwaukee, the council has assumed an important and definite leadership in industrial relations. Its aims and purposes are enunciated clearly in the following formal "Declaration of Principles" upon which it was founded and is carrying forward its work:

The principles and ideals of the Milwaukee Employers' Council are embodied in those of the founders of this nation, as expressed in the Declaration of Independence and the Constitution of the United States: viz., that all men, without regard to race, color, or previous condition, are entitled to an equal right and op-

portunity to enjoy life, liberty and the pursuit of happiness, and that this should be exercised by each individual in a spirit of fairness and recognition of the rights of every other individual.

The application of these ideals in industry establishes a system spoken of in industrial terms, as "the open shop"—a system prevailing in shops, factories, stores and on contract work, etc., under which men and women are employed on a basis of ability and honesty, without regard to their affiliations, religious, political, union or otherwise, and under which no discrimination is practiced as to such affiliation.

The council expresses its disapproval of any industrial system which does not provide to every man and woman equal rights and opportunities, or which imposes unnatural limitations upon his or her efforts to attain success.

It holds that fairness, forbearance and good will are the pre-requisites of peace and harmonious co-operation in all the social and economic relations of men; that the interests of the employee and employer are reciprocal; that the success of industrial processes is the result of co-operation between employee and employer, and that their attitude must be that of friends and not of foes. To this end the council hereby reaffirms its policies and principles as set forth in its constitution and by-laws, which are as follows:

- 1 To promote, on a fair and equitable basis, industrial peace and prosperity in the community, and the steady employment of labor.
2. To provide proper safeguards for the health and safety of the employees.
3. To secure for employer and employee alike freedom of contract in the manner of employment.
4. To discourage strikes, lockouts, and unfair demands by either employer or employee.
5. To uphold the principle of the open shop.

Gain in Metal Working at Milwaukee

MILWAUKEE, WIS., Jan. 21.—"The gain in iron and steel, while confined to a few plants, is a cheerful indication," says *Business and Financial Comment*, issued by the commercial service department of the First Wisconsin National Bank of Milwaukee, speaking of a gain of 6.2 per cent in the number of persons employed in the iron, steel and machinery industrial group of the city during December, compared with November. A gain of 5.07 per cent in the automobile parts and accessories industry also is reported. In a general way, the number employed in Milwaukee county at the close of last month was 5.7 per cent greater than at the close of November, which showed a loss of 3.02 per cent from October. The review says further: "Production and sales of many lines of industry in Milwaukee indicated a lull in December which was characteristic of industrial activity all over the country. Firms making automobile accessories and parts for popular-priced cars have large orders on hand for late winter and spring delivery. The automobile truck industry is still quiet, but should receive stimulation from the prospective activity and construction this year."

Fewer Steel Workers at Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for December a loss of 232 employees from November in 120 establishments. This loss of 0.2 per cent is accompanied by a gain of 5 per cent in the amount of the payroll, and by an advance from \$42.46 to \$44.66, or 5.2 per cent, in the average pay envelope. Automobile building, on the other hand, has fallen off, both in number of employees and in total and average wage. There were 2742 fewer men (3 per cent), and the average pay was \$2.53 (4¼ per cent) less per half-month. Men engaged in building and repairing railroad cars have increased 1822 in number (8.2 per cent), but the average wage has decreased 17c. for the half-month (0.3 per cent).

Although the steel worker is the only one of the

three groups receiving an increased average pay in December, the other two, averaging \$58.13 to his \$44.66, were getting 30 per cent more than he.

To the figures as furnished by the bureau have been added totals for the three metal-working branches covered by the bureau. These total figures show a loss of 1152 in number of employees, compared with November, but the average pay has increased 14c. (0.3 per cent). In the table, figures for December, 1920, are compared with those for the two last months of 1921.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Half-Month Pay
Iron and Steel				
December, 1920.	121	177,016	\$13,755,557	\$77.70
December, 1921.	120	224,871	5,576,970	44.66
November, 1921.	120	125,103	5,312,453	42.46
Automobiles				
December, 1920.	52	94,475	5,745,809*	60.82
December, 1921.	51	87,833	5,009,052*	57.03
November, 1921.	51	90,575	5,394,942*	59.56
Car Building and Repairing				
December, 1920.	61	73,455	5,385,217	73.32
December, 1921.	61	58,354	3,487,628	59.77
November, 1921.	61	56,532	3,388,556	59.94
Metal Working Plants†				
December, 1920.	234	344,946	24,886,583	72.15
December, 1921.	232	271,058	14,073,645	51.82
November, 1921.	232	272,210	14,095,961	51.78

*Equivalent half-month payroll; 2 1/6 times the weekly figure quoted by the bureau.

†Sum of the three groups detailed above.

More Unemployment in Illinois

Employment in Illinois industries declined in December for the third consecutive month, according to statistics compiled by the general advisory board of the Illinois Department of Labor. Signed reports from 731 firms in all parts of the State show a reduction that runs throughout the range of industries, and varies from 3.3 per cent in the metal machinery and conveyances group to 18.4 per cent in the stone, clay and glass products group. The reduction in the volume of em-

ployment for industries amounts to 4 per cent. The December slump follows reductions of 0.9 per cent in November and 2.6 per cent in October. The drop in the number of employees in down-State cities was more pronounced than in Chicago. Reports from 836 Chicago firms show only 2.7 per cent fewer employees on Dec. 31 than on Nov. 30, as contrasted with the 4 per cent drop for the State at large.

Cost of Living Stationary

Monthly figures of the Bureau of Labor Statistics show the wholesale price of all commodities during December to be 49 per cent above the average for 1913, compared with 49 per cent in November and 50 per cent in October. There was a slight drop in farm products, in cloths and clothing, in food and in drugs and chemicals. Building materials are up 6 points, to 203, and fuels and miscellaneous items have advanced. Metals are stationary, at only 19 per cent above 1913; house furnishings are also stationary, but stand at 218, or more than double 1913.

Our table shows the figures for the two most recent months, for December, 1920, and the peak of 1920. It shows also the amount of liquidation, between the peak price and the present, of the excess of the peak price over the average of 1913. Metals have been liquidated 80 per cent, only one group (farm products) showing a higher degree of liquidation.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920— Peak		1921— Decem- ber		Liqui- dation, Per Cent
	Decem- ber	ber	ber	ber	
Farm products.....	246	165	114	113	90.1
Food, etc.....	287	196	142	139	79.1
Cloths and clothing.....	356	234	186	185	66.8
Fuel and lighting.....	284	258	186	187	52.7
Metals and metal prod- ucts	195	170	119	119	80.0
Building materials.....	341	274	197	203	57.3
Chemicals and drugs...	222	207	162	161	50.0
House-furnishing goods.	371	369	218	218	56.5
Miscellaneous	247	220	145	148	67.3
All commodities.....	272	207	149	149	71.5

In the Field of Labor

The New London Ship & Engine Co., New London, Conn., has received a Government contract that will keep a large part of the plant operating on its present scale during 1922. It is planned to slightly increase the number of employees.

The plants of the General Electric Co., at Bridgeport, Conn., formerly the wartime plant of the Remington Arms Co., have been gradually increasing the working force during the past six or seven weeks until now more than 1500 hands are employed steadily.

In its move toward economy, the Western Maryland Railway, Baltimore, has leased its shops to the man who has been employed as the general foreman. A number of the positions which existed while the shops were operated by the railroad are to be abolished. The men who are retained by the contractor will be hired at a lower wage scale.

Crane Co., Chicago, and Bridgeport, Conn., has reduced the wages of shop forces 12½ per cent. This is the first reduction by Crane Co. from the wartime wages. Its plants are operating at 50 per cent of capacity.

Employees of the Belvidere Screw & Machine Co., Belvidere, Ill., unanimously adopted a resolution on Dec. 31, in support of a protective tariff and the American valuation plan. Copies of the resolution were sent to the United States senators from Illinois as well as to the district representative in Congress.

In the interests of the employees of the Central Region of the Pennsylvania Railroad System the *Pennsylvania News*, a four-page newspaper, has been started. It contains many photographs and feature stories.

HOW LABOR CAN HELP BUSINESS*

Economics of Labor Returns Pointed Out— —Greater Production Helps Everybody

When opening up the Miami mine in Arizona, some 14 years ago, we did the work with the small one-man air-drills. Previous to that time all operating in Arizona had been with the larger drill, requiring two men. The miners objected to this one-man drill, saying that we were throwing one man of every two out of work.

But every time I went underground I impressed upon my men the fact that the material being developed had in the past not been considered ore, because of its low grade; that to make it available it must be mined cheaply; that if two men were put on a drill the material was not pay ore, but that if each man operated his own drill, then the material was pay ore; and that, far from throwing one man of every two out of work, I was finding new places for two.

It did not take very long to sell this idea to them, and in a few months it would have been impossible to get the men back to the use of the old drills requiring two men. Most of the work was done on contract, and each man felt that he got paid for what he did, and was not responsible for a helper who might perhaps not co-operate with him, or in fact might even retard his work.

Among the responsibilities of labor is that of increasing production. Among the unenlightened, the idea that there is a fixed amount of work to be done in the country, and that the less a man does the longer the work lasts and the more men are employed, is of course an economic fallacy held by a great many men. There never was a greater fallacy than this, and the best minds in labor circles realize its fallaciousness. Still, it must not be forgotten that labor has had many sad experiences in the last 80 years, in which the result of increased effort, mental and physical, has not been rewarded as it should have been, but has been entirely appropriated by capital.

We must, however, realize that there is a happy medium. If, for example, the cost of producing any article of vital use to the community is cut in two, or even down to one-tenth of its original cost, it is uneconomic that the laborer or the capitalist, or both, should retain for themselves this entire saving. The proper end is that the selling price of the article be reduced, with a consequent greater consumption and necessary advantage to the consumers as a whole.

Fortunately, competition and the laws of trade to a large extent govern this, but the basic thing to remember is that wages are not paid by money, but by the goods and services rendered by all. The more goods produced and the more services rendered, the more there is for everyone to receive.

Unemployment in British Steel Industry

Except for the tin plate activity in South Wales, it is estimated that the British steel industry is operating at only one-quarter to one-third of normal. In a report of the United States Trade Commissioner, London, to the Department of Commerce, the number of unemployed in the iron, steel and allied engineering trades in various centers includes 61,000 in Newcastle, 40,000 in Middlesbrough, 40,000 in Sheffield, 20,000 in Glasgow, 17,000 in Sunderland. The total is more than 200,000, when Birmingham and Barrow are included; and the number of people involved, including dependents, is probably 1,000,000.

Among those reported as employed, many thousands were working part time, some of them only two days a week. Many of the blast furnaces have been idle since the first day of the coal strike, last April, there being only 70 furnaces in blast at the end of November, as compared with 235 a year previous.

*From an address on Waste in Industry, by J. Parke Channing, at Cleveland, Jan. 18, before national convention of Associated General Contractors.

Machinery Markets and News of the Works

LARGE MEXICAN INQUIRY

National Railways Want to Buy \$300,000 Worth of Machine Tools

Little Prospect of Business Being Closed on Credit Terms Offered Trade Improving Slowly

An inquiry for \$300,000 worth of machine tools, about 120 items, from the National Railways of Mexico, with offices in the Woolworth Building, New York, has not attracted the attention that might be expected, as the railroad's representatives are seeking to buy on two-year open credit. An effort has been made to place the business with one large machinery company, but the few to which the proposal has been made do not seem anxious to sell on the terms suggested.

In some sections a slightly improved demand for machine tools is in evidence. Activity is more marked in the Central West than in the East. An inquiry for 10 machines, six cranes and six triplex hoists comes from Heaters, Inc., St. Paul, Minn. A Detroit dealer is in the market for several used machines for customers. The Arvac Mfg. Co., Anderson, Ind., manufacturer of universal joints, has bought several drilling machines and is in the market for 18 small turning

lathes and two or three milling machines. The Fisher Body Ohio Co., Cleveland, within the past two or three weeks has added to its equipment of drilling machines and presses. Warren Webster & Co., Camden, N. J., manufacturers of heating apparatus, have bought 10 screw machines, both hand and automatic. An Indiana manufacturer is inquiring for six engine lathes.

Railroad buying is not important, but some orders for single machines are being placed. The Chesapeake & Ohio has issued a new list of several tools. The Illinois Central is preparing a budget of its machine-tool requirements for the next three years and plans to buy a part of the list every six months.

Contractors bidding on the cast iron segments for the New York-New Jersey vehicular tunnel are inquiring for molding machines, one such inquiry asking bids on eight or 10 machines. Other foundries are also in the market for new casting equipment.

Export demand is not active, hence some importance attaches to revived inquiry under consideration by Cincinnati manufacturers for about 15 tools, totaling \$60,000 in value.

The Wheeling Steel Corporation will soon inquire for 10 or 12 cranes, including two 150-ton ladle cranes, for improvements at its Steubenville and Portsmouth, Ohio, works.

New York

New York, Jan. 24.

The National Railways of Mexico, with New York offices in the Woolworth Building, have sent out an inquiry for about 120 machine tools, entailing an expenditure of \$300,000. There is some doubt, however, as to the business being placed as the Mexican interests desire to buy on open credit terms of two years. An effort is also being made to place the order entirely with one company, but those which have been approached do not appear anxious to book the order on the terms offered. Among the machines inquired for are the following: 42-in. coach wheel lathe, 60-in. horizontal boring machine, two electric cranes, 50-ton capacity, one electric crane, 15 ton capacity, 96-in. vertical boring and turning mill, 60-in. multiple spindle cylinder boring, tapping and milling machine, 50 ton hydraulic bushing press, 12-in. vertical boring and turning mill, 24-in. back-gear speeder, 48-in. single-end vertical punch, 5-ft. radial drill, 12-in. coach wheel lathe, 850-lb. steam hammer, 300-ton hydraulic car wheel press, flue welder, 4-ft. radial drill, pneumatic hoists, car axle lathe, 96-in. locomotive wheel lathe, 400-ton hydraulic car wheel press, and many other items.

Warren Webster & Co., manufacturers of heating apparatus, Camden, N. J., have bought about 10 screw machines, both hand and automatic. Not much new inquiry has come into the market the past week. Inquiries are mostly for single machines and no marked improvement either in inquiries or orders is noted.

No change is reported in the crane market. There is a slight increase of activity in electric and hand power hoists. One manufacturer, who recently placed a new electric hoist on the market has booked orders for about 200 of ½-ton and 1-ton capacities in the past three months. The 40-ton overhead electric crane inquired for by the New York Central & Hudson River Railroad recently will probably be placed soon. Several electric cranes of small capacity are pending. Niles-Bement-Pond Co., has placed two 100-ton electric cranes with a Southern company.

Thomas J. McManus & Sons, 33-35 Moultrie Street, Brooklyn, operating an automobile machine and repair works,

have filed plans for a two-story factory addition, 25 x 100 ft., to cost about \$14,000, exclusive of equipment.

The Lion Brewery, 108th Street and Columbus Avenue, New York, has awarded contract to Cunningham & Foley, Inc., 217 West 116 Street, for additions and improvements in its two-story machine shop, to cost about \$25,000.

The Erie Railroad Co., 50 Church Street, New York, is concluding arrangements with the Youngstown Equipment Co., Youngstown, Ohio, for the operation of its car shops at Kent, Ohio, giving employment, normally, to about 700 men. The road has awarded a contract to the Dickinson Construction & Repair Co., Youngstown, for its maintenance of way work from Salamanca, N. Y., to Marion, Ohio, about 400 miles. J. B. Dickson is president of the latter organization.

The U-Need Ice Co., 2150 Amsterdam Avenue, New York, is taking bids for a two-story ice-manufacturing plant, 157 x 214 ft., at Mt. Eden and Inwood avenues, estimated to cost about \$175,000, including machinery. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

The Tunnel Garage, G. L. Stevers, president, 2 Charlton Street, New York, has preliminary plans under way for a new repair and service building at Broome and Thompson streets, to cost about \$75,000.

Charles Cohen, 308-10 Oakland Street, Brooklyn, operating a plant for the manufacture of automobile bodies, has filed plans for a one-story addition, 25 x 100 ft.

The New York Central Railroad Co., Grand Central Terminal, New York, W. C. Bower, purchasing agent, is taking bids until Feb. 3 for a quantity of wire fencing, track bolts, splice bars, frogs, switches, etc.

Merkel Brothers, Sutphin Boulevard, Jamaica, L. I., are having plans prepared for a three-story refrigerating and cold storage plant, 60 x 75 ft., on Chichester Avenue. Louis Allmendinger, 20 Palmetto Street, Brooklyn, is architect.

Mouritz F. Westergren, Inc., 213 East 144th Street, New York, manufacturer of sheet metal products, has awarded a contract to the Cauldwell Wingate Co., 381 Fourth Avenue, for the erection of a two-story plant addition, 28 x 96 ft., estimated to cost approximately \$20,000.

R. Steel & Sons, Inc., 558 West 162d Street, New York, recently incorporated with a capital of \$50,000, to manu-

facture iron and steel products, has filed plans for a one-story machine and forge shop, 60 x 200 ft., on Vernon Avenue, Long Island City.

Louis Fishman, New York, has leased the one-story building on site, 100 x 150 ft., at 140-50 West 146th Street, for an automobile repair and service works.

The K. & O. Co., Inc., 366 Butler Street, Brooklyn, manufacturer of metal products, has commissioned Frank Quimby, 110 William Street, New York, architect, to prepare plans for extensions and improvements in its five-story factory. E. Oldendusch is president.

The Metropolitan Roofing Material Co., 214 East 135th Street, New York, has awarded contract to the Schwab building Co., 223 South Fifth Avenue, Mt. Vernon, N. Y., for a new one-story and basement building on 137th Street.

An electrically operated pumping plant to cost about \$110,000 with machinery is being planned by the city of Orange, N. J., in connection with a trunk sewerage system. Walter L. Hull is city engineer.

The Morse Rogers Steel Co., 1038 South Kolmar Avenue, Chicago, has leased property at the new Shupe Terminal plant, Lincoln Highway and the Passaic River, for an Eastern works. The Martin-Parry Corporation, 560 Jackson Avenue, Long Island City, manufacturer of automobile bodies, with headquarters at York, Pa., has also recently leased a building at this location. The Shupe Terminal Corporation, operating the terminal, will develop the property for industrial service. William F. Shupe head of the William F. Shupe Co., 85 Day Street, Orange, N. J., is president of the corporation.

The Kelsey Motor Co., 25 Branford Place, Newark, N. J., will soon commence the installation of machinery at the first unit of its new plant on Washington Avenue, Belleville, N. J., for the manufacture of motor trucks and parts. The unit nearing completion approximates 34,000 sq. ft. of floor space and will cost about \$150,000. It will have a capacity of about 3000 cars a year. The company has 7½ acres at this location to provide for additional units.

Thomas L. Raymond, director, Department of Streets and Public Improvements, City Hall, Newark, will receive bids until Jan. 30, for equipment for the repair plant of the department at 9-11 Jay Street, including one electric-driven blacksmith forge, with tapers iron complete; one electric-driven post drill, with motor; tire bender; nut and bolt cutting machine, with taps, dies and friction countershaft; electric-driven emery machine with two grinding wheels, and motor, 240 lb. blacksmith anvil, one 3-hp. motor. On another specification, the department at the same time will receive bids for a quantity of horseshoe nails and other horseshoe material. Specifications are on file in room 309, City Hall.

Philadelphia

PHILADELPHIA, JAN. 23

The Pennsylvania Equipment Co., 1120 Chestnut Street, Philadelphia, is in the market for fifteen or twenty Roger convertible ballast cars, center and side dump type, 80,000-lb. capacity.

The Acme Motor Truck Corporation, Philadelphia, has leased the two-story building at 131-33 South Twenty-fourth Street, for a truck repair and service works.

The John T. Lewis & Brothers Co., Lafayette Building, Philadelphia, will soon break ground for a two-story power plant on Aramingo Street, estimated to cost about \$100,000. The Turner Construction Co., 1713 Sanson Street, is contractor.

The Colonial Electric Co., Philadelphia, has leased two floors in the four-story building at 922 Arch Street, totaling about 6000 sq. ft. of floor space, for local works.

The John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire, cables, etc., will soon commence operations at its addition on Lator Street, now nearing completion. A number of present departments will be transferred to the building and a few additions made to the working force.

The Standard Tank & Seat Co., Camden, N. J., is taking bids for a new building at 320 North Front Street. O. M. Hokanson, Bailey Building, Philadelphia, is architect.

Otto R. Heilgman, receiver for the Winfield Barnes Co., Philadelphia, manufacturer of steel products, has disposed of the plant at Erie Avenue and Twentieth Street to B. Foster and associates for \$86,000. The property consists of a number of buildings on site 241 x 330 ft.

The Lanston Monotype Machine Co., Twenty-fourth and Locust streets, Philadelphia, is perfecting plans for the manufacture of the Barrett adding, listing and calculating

machines, following the recent acquisition of the Barrett Machine Co., 1214 Race Street, Philadelphia.

The Bessemer Motor Truck Co., Grove City, Pa., is arranging for the removal of its works to Holmesburg, Philadelphia, where headquarters in the future will be conducted. The new plant is located on a tract of eighteen acres, and has been designed for a capacity of 3000 motor trucks per year. Additional units will be built when necessary. I. M. Lewis is president of the company.

The Pennsylvania Edison Co., Easton, Pa., has completed plans for a one-story addition to its generating plant, 30 x 56 ft., estimated to cost about \$50,000. It will also erect a two-story shop building, 40 x 64 ft., on Dock Street. A portion of the building, which is estimated to cost about \$35,000, will be used for office service.

Fire, Jan. 18, completely destroyed the plant and machinery of the Boyertown Planning Mill Co., Boyertown, Pa., with loss estimated at about \$50,000. A. P. Griffith is treasurer and general manager.

The Loch & Battista Mfg. Co., Berwick, Pa., manufacturer of flush tanks, is arranging for increased production to total about 1500 tanks per month. Additions will be made to the working force.

The Auto Radiator Service Co., Cameron and Mulberry streets, Harrisburg, Pa., has completed plans for enlargements and work will be placed under way at once. Additional machinery will be installed for sheet-metal working and repair of automobile radiators, fenders, bodies, etc. Edward J. Sherman and Harry W. Haas head the company.

Fire, Jan. 13 destroyed the plant and machinery of the Mercer Flooring Co., Cunningham Street, Mercer, Pa., with loss estimated at about \$150,000.

The Middletown Ice Co., Middletown, Pa., recently organized, has tentative plans under way for a new ice manufacturing plant. Charles Myers is president and L. J. Borges secretary and treasurer.

The Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, is planning for an addition to the power house at its Locust Spring colliery, to double the present capacity.

New England

BOSTON, JAN. 23.

Machine-tool prospects of any importance whatever are developing slowly. Companies having purchases of equipment under consideration apparently are no nearer closing than they were a week ago. Unless the unexpected happens, bookings by New England dealers for January will fall considerably below predictions made early in the month. During the past week there has been more or less interest shown in equipment by small manufacturers, who are governed more by price than by requirements of machines, and shopping by these interests is carried to extremes, especially in the used machine tool market.

Sales the past week disclose a further shrinkage in volume of turnover and cash. They include a 3½ ft. radial drill to a Massachusetts maker of textile machinery; special production machinery to a Portland, Me., manufacturer of marine hardware; small grinding equipment to the American Steel & Wire Co., Worcester; a No. 2 Pratt & Whitney die sinker to a Rhode Island manufacturer; a 13-in. x 5-ft. lathe to a Worcester manufacturer of musical instruments; 16-in. x 12-ft. lathe to a textile machinery interest, and a 20-in. upright drill and tool grinder to a Medford, Mass. garage, all new machinery; a four-spindle Prentice sensitive drill to a Middleboro manufacturer; special lathe for crankshaft turning to a Waltham automobile manufacturer; and four small milling machines to a local maker of fountain pens, the last six pieces of equipment selling out of the used tool market. A limited list of light equipment for a small experimental shop to be started in Massachusetts, and a cutting off machine for the General Electric Co., Pittsfield, are the only new prospects in sight.

Dealers in new equipment have developed some prospects, however, but because such business is not competitive little in the way of detail is forthcoming. They deal largely with special production equipment and drilling machines. The same firms admit that lathe prospects which looked promising earlier in the month, have been placed in the doubtful files. A few individual firms report a better demand for hand tools, notably portable electric drills.

Several New England builders of machine tools, to keep plants operating at the highest ratio during the present depression, have gone or are going into the manufacture of new lines, such as a level for truing up machine tools, portable drills, testing cylinder gage, small grinding machines, wood-working machinery, and one company is about to turn

over a large part of its plant to the manufacture of spinning machinery, the order for which runs close to \$1,000,000. The development of new machine tools is not neglected in the meantime, however. During the past few months New England makers have turned out many newly designed tools and 1922 promises other machinery developments. Makers of railroad shop tools in this section have secured sufficient business to warrant increased activities, but operating schedules are still far below normal.

At the moment a decided improvement in the demand for gears is noted. Manufacturers of Mass. gears have put out more quotations the past ten days than in a long time. The interest shown by makers of rolling mills and users is especially good. One local gear maker has about all the business he can handle, and many other Massachusetts companies are doing much better than a month ago. Small gears are not only wanted for new machinery, but for replacement as well. One gear maker in this section recently was obliged to buy new metal-working equipment.

The Segal Metal Products Co., Springdale, Conn. has awarded contract for a manufacturing unit.

The foundry of White & Warner Co., Tremont Street, Taunton, Mass. recently was damaged by fire with an estimated loss of \$50,000.

The Stamford Rolling Mills Co., Springdale, Conn., has sent out inquiries for complete oil engine power equipment with electrical generators for its two mills at Stamford and Springdale, Conn. Each power house will be approximately 2500 hp. and will supply motors on a rolling mill load, which are now installed. C. F. Hunter is general purchasing agent.

A vocational department will be installed in the new three-story high school, 70 x 188 ft., now being erected at Manchester, N. H., and estimated to cost in excess of \$900,000. C. E. Whitcher, 814 Elm Street, Manchester, is architect; R. D. Kimball, 6 Beacon Street, Boston, is engineer.

Walter W. Field, 39 Hayward Street, Cambridge, Mass., has filed plans for rebuilding the portion of his machine shop recently destroyed by fire. The work, exclusive of equipment, will cost about \$10,000.

The E. Z. Fold Ironing Table Co., Westboro, Mass., recently organized, has taken over the former plant of the Forbes Sleigh Co., Summer Street, and will operate at this location. George W. Lewis heads the company.

A vocational department will be installed in the new two-story high school, 225 x 245 ft., to be erected by the Town School Board, Stratford, Conn., estimated to cost about \$450,000. Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

A vocational department will be installed in the new junior high school to be erected at Westville, Conn., to cost about \$200,000. H. M. Greist, of the Greist Mfg. Co., is chairman of the building committee; Brown & Von Beren, 185 Church Street, New Haven, Conn., are architects.

The Waterbury Mfg. Co., 236 Grand Street, Waterbury, Conn., manufacturer of sheet brass goods, etc., recently purchased a factory on College Street, Middletown, Conn., from William E. Stroud. It is 50 x 102 ft. and will be used for the manufacture of its products. An addition is contemplated later.

A vocational department is planned for the new high school to be erected at Belchertown, Mass. The architect has not yet been selected but sketches have been submitted. Wilbur F. Nichols is chairman of the building committee.

Cleveland

CLEVELAND, Jan. 23

The proposed New York-New Jersey vehicle tunnel has brought out inquiries for eight or ten large molding machines from foundries planning to bid on the cast iron segments, and a fair volume of inquiry for molding machines has come out this month from other foundries engaged in work outside of the automotive field, making the outlook in molding machine lines much better than it was late last year.

The machine tool market shows improvement in the number of inquiries, but orders have not increased, as prospective purchasers are very slow in closing deals. The Fisher Body Ohio Co. is adding equipment to its Cleveland plant, having placed several small orders for drilling machines and presses, aggregating about a dozen tools, in the past few weeks. The Arvac Mfg. Co., Anderson, Ind., maker of universal joints, has purchased several drilling machines and has inquiries out for 18 turret lathes, 18 small turning lathes and two or three milling machines. The machinery equipment of the American Ball Bearing plant, Cleveland, of the Standard Parts Co., will be sold at auction Jan. 26. It is stated that this is attracting little interest, as practically all the machines that were in fair condition have been sold.

The demand for locomotive cranes shows no change over the past few months. Makers are getting a few single machine orders both for export and domestic use.

The Rose Machine & Spring Co., Canton, Ohio, formerly the Buckeye Machine & Spring Co., has been incorporated with a capital stock of \$50,000. D. H. Rose, who has operated the plant of the Buckeye company for several years, will be head of the new company.

The Miami Tractor Co., Celina, Ohio, recently organized, is planning to add a foundry and other extensions to its present plant. It will have a capital stock of \$2,600,000, of which \$1,500,000 will be preferred stock. V. A. Conover is president.

The main building of the plant of the Glass & Machine Works, Jewett, Ohio, was burned recently. It is stated that it may not be re-built.

The Ohio Structural Steel Co. has established a plant at Newton Falls, Ohio. M. H. Stauffer, formerly with the Niles Forge & Mfg. Co., Niles, Ohio, is president and general manager.

The Steel City Iron Co., Youngstown, Ohio, is being organized with a capital stock of \$150,000 by A. W. Lau, formerly of the Lau Iron Works, and others. It contemplates establishing a plant for fabricating general structural work and ornamental iron work.

The Nichols-Lintern Co., 8404 Lorain Avenue, Cleveland, manufacturer of railroad equipment, has awarded a contract to the Austin Co., 16112 Euclid Avenue, for a one-story addition, 60 x 65 ft., estimated to cost about \$65,000.

The Stahl Auto Body & Wagon Co., 6533 St. Clair Avenue, Cleveland, manufacturer of automobile bodies, is having plans prepared for an addition, including improvements in present buildings, estimated to cost about \$40,000.

The Glenwood Motor Car Co., East Seventy-first Street and Euclid Avenue, Cleveland, is completing plans for the erection of a new one-story plant at Findlay, Ohio, 90 x 570 ft. J. B. Cline is president.

The K. W. Brick Co., 607 Home Savings & Loan Building, Youngstown, is completing plans for a one and two-story brick and tile manufacturing plant at Warren, Ohio, 70 x 150 ft., estimated to cost close to \$40,000. J. Whittaker is president.

Baltimore

BALTIMORE, JAN. 23.

The Spanish-American Cork Co., Westport, near Baltimore, has plans under way for rebuilding the portion of its plant on the Fish House Road, recently destroyed by fire. It is estimated to cost about \$45,000. O. J. Harms is president.

The Board of Awards, City Hall, Baltimore, will take bids until Feb. 1 for furnishing and erecting two 2,000,000-gal. electrically operated centrifugal pumps, with electrical equipment, for the Belair Road pumping station. William A. Megraw is engineer, and William F. Broening is president of the Board of Awards.

The Board of Education, Baltimore, has acquired 14 acres between West Forest Park and Arlington for a new senior-junior co-educational high school, to include vocational department. Plans will be prepared by Parker, Thomas & Rice, Union Trust Building, Baltimore. It will cost in excess of \$500,000.

The Friedman Ice & Cold Storage Co., Savannah, Ga., is completing plans for rebuilding its ice-manufacturing and cold storage plant, recently destroyed by fire. It will cost about \$50,000. S. Friedman is president.

Fred Foster, Radford, Va., has plans under way for a new one-story machine shop.

Fire, Jan. 14, destroyed a portion of the woodworking plant of the A. T. Griffin Mfg. Co., Goldsboro, N. C., with loss estimated at about \$50,000, including machinery.

The Universal Service Station, Front Royal, Va., is planning the establishment of a one-story machine shop for automobile repair work and parts manufacture.

The Brunswick Cross Arm Co., Brunswick, Ga., F. N. Coleman, Box 167, president, is contemplating the immediate erection of a new plant, 80 x 210 ft., to replace its works recently destroyed by fire. Equipment to be installed includes boring machines, band resaws, edgers, files, planers and other wood-working machinery.

The Tyler Machine Co., Florence, S. C., is planning to rebuild its machine shop, recently destroyed by fire. L. Tyler heads the company.

F. E. Hatch, Albany, Ga., has acquired a site at the Bank's mill pond, Milltown, Ga., for a new hydroelectric generating plant.

A vocational department will be installed in the new

high school to be erected at High Point, N. C. A bond issue of \$750,000 is being arranged.

D. C. Elphinstone, 408 Continental Building, Baltimore, is making inquiries for an auto crane, caterpillar or road wheel type.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturer of sheet metal products, will break ground in the spring for its new four-story plant at McComas and Donaldson streets, 66 x 75 ft., and estimated to cost \$350,000, including machinery. George B. Monmonier & Son, 1711 McCulloch Street, have the building contract.

The Alexander Granite & Land Co., Statesville, N. C., is planning for the operation of a rock quarry in the vicinity of Hiddenite, N. C., and will install an electrically operated crushing plant. J. M. Deaton is president.

A vocational department will be installed in the new high school to be erected at Southport, N. C., bids for which are being asked. W. J. Wilkins & Co., Wilmington, N. C., are architects.

The American Furniture Co., Martinsville, Va., is perfecting plans for a new power house, estimated to cost \$50,000. A. D. Witten is engineer.

The School Board, Rockingham, N. C., is planning for the erection of a new high school to cost close to \$100,000. A vocational department will be installed.

Fire, Jan. 8, destroyed the machine and repair department, and adjoining sections of the automobile works of George C. White & Sons, Richmond, Va., with loss estimated at about \$50,000.

The Gulf Refining Co., Pittsburgh, Pa., is contemplating the construction of a steel tankage plant on Hutchinson Island, Savannah, Ga., to have a capacity of about 55,000 bbl., and estimated to cost approximately \$100,000.

The Lock Joint Pipe Co., Baltimore, has leased a site for a plant to manufacture pipe. A. M. Hirsh is president.

The Parker Metal Decorating Co., North Gay Street, Baltimore, whose factory was recently damaged by fire, is said to be arranging to locate at the plant formerly occupied by the Union Smelting & Refining Co., Inc. Howard and Ostend streets, where an addition will be erected. E. A. Parker is president.

The American Wood-working Corporation, 5 Uhler Street, Baltimore, will build a three-story addition, increasing the floor space to 35,000 sq. ft. Additional equipment will be installed. Arthur Pierson is president.

Hackney Brothers, Wilson, N. C., manufacturers of carriages will rebuild their burned plant and install new equipment.

The Maryland Steel Rolling Co., Fidelity Building, Baltimore, will build a one-story factory, 66 x 228 ft., to cost \$10,000.

Cincinnati

CINCINNATI, JAN. 23

Chief interest in the machine tool market the past week, centered in the revival of an inquiry for 15 tools, valued at approximately \$60,000 for shipment to Japan. This inquiry was put out last summer, but has since been revised and heavier types of machines specified. It is expected that the order will be placed within the next two weeks. An Indiana manufacturer is in the market for six lathes and the Chesapeake & Ohio Railroad has also issued a list for several tools. Orders booked the past week were usually for single machines but in larger number than the previous week and manufacturers are more encouraged as a result. Used machinery dealers report business as only fair.

Frank P. Shaw, Chicago, representative of an unnamed automobile concern, was the highest bidder for the plants and equipment of the Allen Motor Car Co., in Columbus and Bucyrus. Mr. Shaw's bid was \$570,000 and it will likely be accepted. It is understood that as soon as the deal is closed, operations will be resumed at the Allen plants.

The Dayton Malleable Iron Co., Dayton, Ohio, which recently purchased the plant of the Timkin Detroit Axle Co., Canton, Ohio, has closed a contract with the Timkin company for its entire malleable iron castings requirements. The Dayton company will take control of the Canton plant on Feb. 1 and will operate it for automobile and railroad work.

The Ramey Mfg. Co., Columbus, Ohio, manufacturer of electric cleaners, saw mill blowers and furnaces, has taken a long term lease on the Immel Auto Body plant, 8 East Livingston Avenue and is making alterations preparatory to establishing headquarters there by Feb. 15. The company expects to largely increase its output of furnaces and will practically double the force employed. E. J. Ramey is president.

The City of Corbin, Ky., is receiving bids on \$60,000 worth of light and water bonds and is planning to build a municipal light and water plant. John C. Myers is city clerk.

The City Commissioners of Newport, Ky., have passed an ordinance providing for the issuance of \$150,000 in bonds for installing a new pump at the waterworks plant to supply a minimum of 6,000,000 gal. of water daily. Mayor J. H. Hermann is chairman of the commission.

William Gilbert, president, Buckeye Foundry Co.; Cincinnati, has acquired the controlling interest in the Bollman Wilson Foundry Co., 500 East Front Street. It is the intention later to make alterations and additions.

Pittsburgh

PITTSBURGH, JAN. 23

Machinery activities have been even more limited the past week, both sales and inquiries having dwindled. The Brown-Zortman Machinery Co. has sold two 34-in. boring machines to the Erie Ball Engine Co., Erie, Pa. This constitutes the most important business of the week, although most dealers and agencies are getting occasional orders for individual tools, which not infrequently are shipped out of stock. The railroads still are out of the market and outside of the Wheeling Steel Corporation, most of the inquiries emanating from steel companies seem to be either finding out present prices against old projects or for estimating purposes in connection with the asking of appropriations. The Wheeling Steel Corporation, which is to spend about \$5,000,000 on plant extensions and improvements at its Steubenville and Portsmouth, Ohio, works and which recently closed for much mill equipment, is expected to shortly take bids on 10 or 12 cranes, including two 150-ton ladle cranes for the Steubenville plant, and later for the lighter machinery. This business, however, is prospective and current trading in both light and heavy machinery is small. The United Engineering & Foundry Co. has not yet closed for a 10-ton crane with 5-ton auxiliary, although an award is looked for soon. Neither the Ellwood City Forge Co. nor the Elliott Co. seem to be in a hurry to close on the cranes they inquired for sometime ago. Competition for orders is so sharp that prices approximating those of pre-war times now are being made and salesmen report that buyers are taking advantage of this.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has taken bids for a four-story addition, 100 x 200 ft., at Lang and Susquehanna streets, Homewood section. Bernard H. Prack, Keystone Building, is architect.

The Thermatomic Carbon Co., Pittsburgh, a new organization, is arranging for the construction of a plant in the vicinity of Sterlington, La. and has secured a site. It is headed by R. H. Uhlinger, 3612 Bates Street, Pittsburgh.

The W. H. Smith & Sons Co., Johnstown, Pa., will install new lathes, planers, bandsaws, grinding machines, morticing machines and other woodworking equipment at its new plant, now in course of erection. It will replace a mill recently destroyed by fire.

A ventilating system to cost about \$500,000, including mechanical fans, blowers, etc., will be installed by the County officials, Pittsburgh, in connection with the Liberty twin tubes now being constructed through the South Hills. The County Engineering Department is in charge.

A vocational department will be installed in the new two-story high school, 75 x 110 ft., to be erected at Harrisville, W. Va. S. W. Ford, Clarksburg, W. Va., is architect. S. O. Prunty is president of the Board.

The Kanawha Equipment Co., Charleston, W. Va., is making inquiries for a 30 to 40-hp. locomotive type marine boiler for river boat service.

The Guyan Machine Shops, Logan, W. Va., are planning for the installation of new pulleys, belting and other transmission equipment.

The Stonecrete Corporation, 6023 Pennsylvania Avenue, Pittsburgh, has completed plans for a machine shop in connection with its new two-story plant at Cheswick, Pa.

The Wheeling Motors Corporation, Wheeling, W. Va., is planning for a two-story machine shop, 40 x 50 ft., estimated to cost about \$22,000. M. B. Morgan is head.

The American Car & Foundry Co., 165 Broadway, New York, has preliminary plans under way for additions to its works on Third Street, Huntington, W. Va., estimated to cost in excess of \$350,000. A new car shop will be built at a cost of about \$150,000, including equipment. J. W. Ensign is district manager at Huntington.

The Raleigh-Wyoming Coal Co., Professional Building, Charleston, W. Va., will build a new one-story machine shop at its properties, vicinity of Glen Rogers, W. Va. A

new railroad coaling department, stand pipe and other structures will be erected. G. T. Harris is secretary and treasurer.

The new ice-manufacturing plant to be constructed by the Diamond Ice & Coal Co., 912 Bullitt Street, Charleston, W. Va., will cost in excess of \$100,000, instead of about one-half this amount. It will be two-stories, 100 x 100 ft. Plans are being completed by A. C. Bishop, 427 Guardian Building, Cleveland, architect and engineer, and work will commence at an early date.

The Northwestern Coal Co., Keyser, W. Va., recently organized, is planning for the installation of electrically operated mining machinery at its local properties. C. W. Siener is president, and George Wagener, vice-president and general manager.

Buffalo

BUFFALO, Jan. 23.

The Binghamton Heat, Light & Power Co., Binghamton, N. Y., has been granted permission to construct and operate a new electric light and power plant.

The Board of Education, Buffalo, is conferring with the City Council for the adoption of an intermediate trade school program, providing for an appropriation of \$10,000,000 for the erection and equipping of a number of trade and vocational schools.

The Johnson City Motor Car Co., Johnson City, N. Y., has rejected all bids for its proposed one-story service and repair works, 72 x 115 ft., and will call for new bids later. Charles A. Conrad, Phelps Building, Binghamton, N. Y., is architect.

The Merchants Dispatch Transportation Co., East Rochester, N. Y., has completed plans for a new one-story plant, 80 x 560 ft., for the manufacture of railroad equipment. L. F. West is in charge.

The Wiggler Corporation, Buffalo, recently incorporated with a capital of \$50,000 to manufacture signal devices, has established an assembling plant at 2355 Main Street, with daily capacity of about 3000 signals.

Chicago

CHICAGO, Jan. 23.

The improvement in buying which became apparent early this year, has been sustained. Purchases of single machines predominate and it is notable that buyers are looking for bargains, with the result that they often show a preference for used machinery. Current auction sales are well attended and most of the equipment offered is disposed of. During the past week two local sales were held, one at the plant of the Isko Co., manufacturer of refrigerating machinery, and the other at the factory of Knisley Brothers, manufacturer of cornices, fire proof sashes, metallic window frames, etc. Relatively better prices were obtained at the latter sale, because the equipment offered consisted of sheet metal-working machinery, including large bending brakes, punch presses, shears, etc., offerings of which are less frequent than of standard types of machine tools.

The railroads have made no further purchases of machine tools, but have closed for a considerable quantity of miscellaneous shop supplies. The Illinois Central is preparing a large budget covering its machine tool requirements for three years, a program which will call for purchases about twice a year during that period. The Santa Fe has put out an inquiry for two Hisey-Wolf Machine Co. combination internal and parallel grinding machines, type 3 B X D, with one-half horse-power motors arranged either for 220-volt direct current, or 110-volt single phase 60-cycle alternating current.

An encouraging number of inquiries are coming from miscellaneous sources. Houters, Inc., 1927 Dayton Avenue, St. Paul, Minn., has put out the following list:

- One hydraulic pump for press 200 ton pressure.
- One 10-in. x 10-in. air compressor, belt drive.
- One 24-in. to 30-in. throat punch, capacity $\frac{3}{4}$ -in. in $\frac{3}{4}$ -in.
- One 4-ft. to 6-ft. squaring shear for eight-gage stock.
- One Hanna bull riveter 76-in. throat, 30 to 70 tons.
- One bevel shear.
- One power roll for six gage, 7-ft. long.
- One light power punch, any throat.
- One angle roll.
- One rotary shear, throatless preferred.
- Six under-hung cranes, with trolleys 4 ft. high x 10-ft. to 4-ft. reach.
- Six one-ton triplex hoists.

The H. Mueller Mfg. Co., Decatur, Ill., manufacturer of water plumbing and gas brass goods, desires circulars on

drill presses, especially 12-spindle machines for $\frac{1}{4}$ -in. hole and 12-in. diameter circle.

D. E. Morand, machinery dealer, Detroit, is in the market for the following machines for which he has prospective customers:

Three blanking presses, with 6 to 8-in. stroke, 30 to 40-in. wide, 12 to 14-in. height of die space; one single-action press, 7 ft. between uprights, 35 in. depth of ram, 10-in. stroke, 20 in. height of die space; one 50-in. gap press, 4 or 5-in. stroke, 15 to 20-in. depth of ram, similar to "25B" Bliss press; one open-side press similar to Bliss 22; one knuckle joint No. 663 Toledo press. The Pioneer Mfg. Co., Waterloo, Iowa, manufacturer of concrete pipe machines is in the market for a used square or rotary shear for cutting sheet metal. The Standard Automatic Parts Co., Muskegon, Mich., manufacturer of valve and tappet guides, is in the market for a used Pratt & Whitney 6 x 14-in. threadmill.

Two further price changes are reported. The Valley City Machine Works, Grand Rapids, Mich., has reduced milling machines 10 per cent. The Loshbough-Jordan Tool & Machine Co., Elkhart, Ind., has made a reduction of 10 per cent on punch presses, effective Feb. 1.

Edwin Schultz has purchased the interest of Earl H. Renn in the Renn & Schultz machine shop, on South Main Street, Belvidere, Ill.

Plans will soon be completed for a manual arts building, to be added to the Ashland High School, Ashland, Wis. The addition was made possible by the will of the late Charles F. Latimer of that city, who set aside \$50,000 for the purpose.

The McLough Foundry & Machine Co., Marine City, Mich., an institution hardly three months old, is now running at full capacity with a force of 40 men. It is manufacturing automobile pistons.

The Fanyo Garage, Watseka, Ill., was destroyed by fire on Jan. 11, with a loss estimated at from \$60,000 to \$75,000.

The Central Cornice Co., 107 North Twenty-ninth Street, Billings, Mont., manufacturer of ventilating systems, skylights, metal flumes, cornice work, etc., has secured a site on Montana Avenue between North Twenty-ninth and Thirtieth Streets, for a new plant 25 x 130 ft.

Bids are being received by the city engineer of Centralia, Ill. on a new power house.

The Niagara Radiator & Boiler Co., Tonawanda, N. Y., has let contract for a one-story foundry and machine shop, 140 x 175-ft. at 1101 to 1113 East Eighty-third Street, Chicago, to cost \$150,000. A four-story warehouse to cost \$100,000 will be built later. Clark & Walcott, 8 East Huron Street, Chicago, are associate architects in charge of the design of the plant and the Sumner Solitt Co., 225 North Michigan Avenue, has the contract.

The Western Instrument Co., 1001 Washington Boulevard, Chicago, recently incorporated to manufacture surgical, veterinary, dental and electrical instruments, dies, tools and patterns and to do brass finishing, polishing and plating, has acquired 8000 sq. ft. of factory space at the address given and will require the following equipment: Ten hand screw machines, eight punch presses, eight milling machines, 12 drill presses, and 10 speed lathes. The officers include William Ganschow, president; Julius Severus, vice-president and general manager; Charles F. Johnson, secretary and Louis D. Mahon, treasurer.

The Dependable Mfg. Co., Streator, Ill., has taken over the plant and business of the Gahm-McCormick Co., and will manufacture automobile accessories, including spring steel bumpers, oscillating sedan seats, front splash aprons, radiator supports, and rear fittings. Incorporators include C. A. McCormick, M. E. McCormick and W. H. McCormick.

A group of Southern lumbermen, whose identity has not been disclosed has purchased 38 acres as the site for a \$250,000 plant for the construction and repair of freight cars. The tract lies between Forty-eighth and Fifty-second avenues and the west fork of the south Branch of the Chicago River. In the negotiations James N. Litsey, Chicago, represented the purchasers and title was taken by the Greenebaum Sons Bank & Trust Co. as trustee.

A vocational department will be installed in the new North high school to be erected at Omaha, Neb., and estimated to cost \$750,000. John Latenser & Sons, Peters Trust Building, are architects. W. T. Bourke, 603 City Hall is secretary.

Frank D. Chase, Inc., 646 North Michigan Avenue, Chicago, engineer, has construction under way on a new one¹/₂ story and basement foundry at Cadillac, Mich., 87 x 100 ft., estimated to cost \$150,000, including equipment. It will be owned and occupied by a new company being organized by R. J. Teetor of the Mitchell Digging Iron Co., Cadillac.

The American Car & Foundry Co., West Twenty-fourth

and South Paulina Streets, Chicago, has tentative plans under way for an addition for the construction of steel cars. The site requires filling in and eliminating a slip now used for docking purposes. An application for permission to carry out this feature of the work is said to have been refused and the company proposes to seek another site, possibly outside of Chicago.

The City Council, Boone, Iowa, has directed the early completion of plans for the proposed municipal hydroelectric generating plant on the Des Moines River, estimated to cost in excess of \$100,000. Burns & McDonnell, 402 Interstate Building, Kansas City, Mo., are consulting engineers.

The Board of Education, Clarinda, Iowa, Homer S. Stephens, secretary, is taking bids until Feb. 3, for a new two-story and basement high school, to include a vocational department, estimated to cost about \$200,000. Keffer & Jones, 204 Masonic Temple, Des Moines, Iowa, are architects.

The Central South

ST. LOUIS, JAN. 23.

The Stafford Motor Works, Twenty-second and Campbell streets, Kansas City, Mo., has awarded contract to Harvey Stiver, Shubert Building, for a one and two-story machine shop, 65 x 130 ft., estimated to cost about \$27,000. R. A. Curtis, 536 Lee Building, is architect.

The G. G. Hoffman Magneto Co., 3932 Olive Street, St. Louis, is having plans prepared for a new one-story works, 100 x 234 ft., at 3892 Washington Street, estimated to cost about \$50,000. E. Lantz, 600 Post Dispatch Building, is architect.

The Board of Education, Library Building, Kansas City, Mo., will call for bids in February for a four-story addition to the manual training high school at Fifteenth and Forest avenues, 111 x 115 ft. C. A. Smith, 602 Finance Building, is architect; J. A. Brady, Library Building, is mechanical engineer, and J. B. Jackson, secretary of the Board.

The Dixie Coal, Lime & Clay Products Co., Dayton, Tenn., recently organized with a capital of \$750,000, is contemplating the construction of an electric power plant and electrically-operated pumping plant at Graysville, Tenn. It has plans in preparation for the establishment of a brick and tile manufacturing plant, with initial capacity of about 50,000 brick per day. A 50-ton hydrate lime manufacturing plant will also be built. O. E. Thomas is president and manager, and Fred A. Brian, vice-president.

The Rock Asphalt Building Block Co., 638 Stahlman Building, Nashville, Tenn., is arranging for the installation of new equipment at its plant to include a gyratory crusher of about 150 tons daily capacity; revolving screen, 40 in. by 16 ft.; pulverizing machinery, friction hoist, elevators, transmission and other machinery. A. J. Bright is chief engineer in charge.

The American Cornice Works, 237 North Water Street, Wichita, Kan., is planning for the erection of a one-story and basement addition, 25 x 140 ft.

A vocational department will be installed in the three-story high school, 90 x 129 ft., to be erected at Humboldt, Kan., estimated to cost about \$125,000. T. W. Williamson & Co., 312 Central Bank Building, Topeka, Kan., are architects. W. A. Redfield is clerk.

The Hurricane Light & Power Co., Waverly, Tenn., has plans under way for a new hydroelectric generating plant with initial capacity of about 1500 hp., to be increased later to 5000 hp. The company was organized recently with a capital of \$1,000,000. E. T. Stanfield and Roy Carter are heads both of Little Rock, Ark. The first noted will act as engineer.

The Keethler Quarries Co., Fayetteville, Tenn., is planning for the installation of new equipment, including a gyratory crusher, with daily capacity of about 150 tons; jaw crusher of 100 tons capacity; pulverizing equipment; conveying machinery, etc. T. Keethler heads the company.

A vocational department will be installed in the two-story and basement high school, 125 x 130 ft., to be erected at Lexington Ky., and estimated to cost \$175,000. The Frankel-Curtis Co., Ben Ali Theatre Building, is architect. J. C. H. Simrall, McClelland Building, is clerk of the Board.

Brown & Moore, Camden, Ark., will build a new one-story factory to manufacture spokes for automobile wheels. Plans have been completed.

The Signal Mountain Portland Cement Co., James Building, Chattanooga, Tenn., will commence work in March for a new plant in this vicinity, estimated to cost in excess of \$500,000. J. L. Senior is president.

The Board of Trustees, University of Missouri, Columbia, Mo., will soon take bids for its one-story and basement

power plant, 50 x 200 ft., estimated to cost about \$350,000 complete. James P. Jamieson, Security Building, St. Louis, is architect.

The Process Refining Co., Oklahoma City, Okla., recently organized, has acquired the oil refinery of the Pirtle-Pittman Refining Co., Newkirk, Okla., and will take immediate possession. A number of improvements will be made, including the installation of new machinery. A. C. Helden is vice-president, and C. H. Hyde, secretary, treasurer and superintendent.

A vocational department will be installed in the three-story junior high school to be erected at Maplowood, Mo., estimated to cost about \$160,000. Bids will be asked in the spring. William B. Ittner, Board of Education Building, St. Louis, is architect.

The Klein Motor Co., 949 South Third Street, Louisville is planning to rebuild its machine repair and service works, recently destroyed by fire with loss estimated at about \$50,000, including equipment.

A one-story power house will be installed in the new six-story service building to be erected by the Missouri Athletic Association, 407 Washington Avenue, St. Louis, estimated to cost about \$150,000. W. C. Boering is president, G. F. A. Bruggeman, Liberty Central Bank Building, is architect.

The Polar Wave Ice & Fuel Co., Grand and Olive streets, St. Louis, has foundation work under way for its new two and three-story ice-manufacturing plant on Gravois Street, estimated to cost approximately \$500,000 with machinery. H. S. Clymer, Wainwright Building, is architect.

The Muskogee Sand & Gravel Co., 805 Barnes Building, Muskogee, Okla., recently organized, is planning for the construction of a sand and gravel producing plant on property in this section, lately acquired. The installation will comprise crushing and screening machinery, stiff leg derrick, clam shell conveying equipment, holsts, cars, oil-operated engine and other power and operating equipment. O. M. Drake is vice-president and manager.

The Cumberland & Manchester Railroad Co., Barbourville, Ky., is planning for enlargements in its car and locomotive shops. Additional equipment will be installed. Charles F. Heidrick is general manager.

The Belknap Hardware & Mfg. Co., Second and Washington streets, Louisville, is taking bids until Jan. 30, for its proposed addition, 204 x 285 ft., estimated to cost about \$1,000,000. Graham, Anderson, Probst & White, Railway Exchange Building, Chicago, are architects. William Heybourn is president.

Detroit

DETROIT, JAN. 23.

The Bradt Wheel Co., Pontiac, Mich., which will manufacture disk wheels and demountable rims for motor cars, has been organized by Harold Bradt, Rochester, Mich., and is seeking a temporary building. Associated with Mr. Bradt are P. C. Raymond, Rochester, and T. B. Leland, Detroit.

The Simplex Ignition System Co., Chicago, is seeking a site in Marine City, Mich., for the erection of a factory.

The Crodious Steam Pressed Brick Co., Pontiac, Mich., is planning the construction of a new plant.

The Cray-Granzow Machine Co., Benton Harbor, Mich., is contemplating the erection of an addition.

Bernard and E. R. Stroh, have organized the Strolumium Co., Detroit, to manufacture molded aluminum cooking utensils. It is an outgrowth of the Stroh Castings Co., maker of automobile parts and manufacturing will be done in the casting plant on Chene Street. William Roe, general manager Stroh Castings Co., will have charge of production, with Bernard and E. R. Stroh in executive capacity.

Henry Ford has bought the mill site and water rights at Pinckney, Mich., and his engineers are preparing for the construction of a plant at that place.

The Auto Specialties Mfg. Co., St. Joseph, Mich., will build a \$150,000 addition, construction to begin within 30 days. It will give the company 65,000 additional sq. ft. of space.

Construction has been started on the new boiler room of the Mac Sim Bar Paper Co., Otsego, Mich. It will be 60 x 136 ft. and 79 feet from basement to roof, and when completed will represent an expenditure of about \$200,000, including equipment.

The American Furnace & Foundry Co., Milan, Mich., is contemplating an addition to its factory to care for increased business.

A. F. Lavine & Sons, Dayton, Ohio, have purchased the plant and business of the Roy City Spring & Mattress Co. A new building will be erected.

The University of Michigan, Ann Arbor, Mich., S. W. Smith, secretary, will call for bids in the spring for engineering and mechanical shops and laboratories, estimated to cost about \$750,000, including equipment. Smith, Hinchman & Grylls, Washington Arcade Building, Detroit, are architects.

The Lincoln Mfg. Co., 2630 Erskine Street, Detroit, manufacturer of electric lighting fixtures and parts, has work under way on a three-story addition, 30 x 115 ft., estimated to cost about \$100,000, including equipment. Upon completion, the company will extend its line and expects to double the present output. Robert S. Aspinwall is president.

A vocational department will be installed in the new high school to be erected at Albion, Mich., estimated to cost about \$150,000. R. A. LeRoy, 102 Pratt Building, Kalamazoo, Mich., is architect. Donald Harrington is school superintendent.

The Peoples Coal Mining Co., Albion, Mich., recently organized with a capital of \$350,000 to take over the Albion Mining Co., operating coal mines in this section, will electrify the entire property. A new tippie will be constructed, and hoists, pumping machinery and other operating equipment installed.

Bids have been received by the Electric Light and Water Board, Lansing, Mich., for a new municipal power plant. The Walbridge-Aldinger Co., Detroit, was low bidder at \$1,084,305.

Indiana

INDIANAPOLIS, JAN. 23

A vocational department will be installed in the new two-story high school, 170 x 215 ft., to be erected at Marion, Ind., estimated to cost about \$300,000. H. G. Bowstead, 410 Glass Building, is architect.

The Mid West Metal Products Co., Muncie, Ind., has consolidated the manufacturing department of the Kruse Electric Co., Fort Wayne, Ind., at its local works, following the recent acquisition of this branch of the Kruse business.

Fire, Jan. 13, destroyed the power house at the Little Giant Coal Mining Co., property, Linton field, near Terre Haute, Ind. It will be rebuilt.

A vocational department will be installed in the new two-story and basement high school, 55 x 125 ft., to be erected at Butler, Ind., estimated to cost about \$100,000. A. H. Elwood & Son, 201 Haynes Building, Elkhart, Ind., architects, are taking bids until Feb. 2.

The Indianapolis & Cincinnati Traction Co., Germania Building, Indianapolis, has tentative plans under way for the construction of a new one-story machine shop at Cincinnati, estimated to cost about \$60,000.

The Bloomington Nash Motor Co., Bloomington, Ind., has had plans prepared for a two-story and basement service and repair works, 85 x 130 ft., estimated to cost about \$80,000. Walter E. Hottle is head.

A vocational department will be installed in the new high school to be erected at Cayuga, Ind., two-stories and basement, and estimated to cost about \$900,000. The Board of Trustees, Eugene Township, Cayuga, is in charge. John Miller, 30 North Fourth Street, Terre Haute, Ind., is architect.

The Gulf States

BIRMINGHAM, JAN. 23.

The Kirk Refinery Co., San Antonio, Tex., has leased property from the Texas-Mexican Railway Co., Laredo, Tex., for a new oil refinery, with lubricating oil plant. Work will commence at once. It will have a daily capacity of 1200 bbl. of oil per day. E. W. Kirkland, San Antonio, is president.

J. C. Ward, Beaumont, Tex., has filed plans for a new one-story ice-manufacturing plant at Magnolia and Harrison streets, to be ready for operation in May.

A vocational department will be installed in the new three-story high school to be erected at Arlington, Tex., plans for which have been completed. Clarkson & Gaines, 608-7 First National Bank Building, Fort Worth, Tex., are architects.

The Sterling Carbon Co., Sterlington, La., is planning to rebuild its machine shop and engine house, recently destroyed by fire.

The Farmers' Co-Operative Ice & Creamery Co., Fairhope, Ala., recently organized, is planning for the erection of a one-story ice-manufacturing plant. Leonard Payne is president.

The G. R. Mueller Co., Brown-Marx Building, Birmingham,

has inquiries out for a one-story steel mill building, 70 x 80 ft. wide and 400 ft. long, to be provided with a 10-ton traveling crane.

The McKinney Compress Co., McKinney, Tex., is planning for the erection of an addition to cost about \$40,000. Additional equipment will be installed.

The Edwards Mfg. Co., 529-49 Eggleston Avenue, Cincinnati, manufacturer of sheet metal building products, is perfecting arrangements for a new branch plant at Dallas, Tex., estimated to cost about \$60,000.

The Tyler Motor Co., Tyler, Tex., has completed plans for rebuilding its repair and service works destroyed by fire several months ago with loss of about \$50,000.

The San Antonio Public Service Co., San Antonio, Tex., has plans under way for the installation of a new steam turbine, boilers and other equipment at its plant, to cost about \$500,000. It will form part of the proposed improvement and extension program of the company, estimated at \$1,500,000. E. H. Kifer is vice-president and general manager.

The Brown-Joseph Ice Co., Fort Worth, Tex., and other local interests have acquired property at Nashville Street and the Vickery Boulevard, Polytechnic, Tex., for a new ice-manufacturing plant, estimated to cost about \$75,000, including machinery.

A. D. Alessandro, Waco, Tex., has acquired a metal-working plant of 606 Webster Street, heretofore operated by local interests, and will take immediate possession. It will be arranged for the manufacture of metal display fixtures and additional equipment for plating and other work will be installed.

The Dixie Rubber Co., Memphis, Tenn., is considering plans for a branch plant at Miami, Fla., estimated to cost about \$200,000.

The School Board, Rockdale, Tex., will commence construction immediately of a new high school, to include vocational department, estimated to cost about \$75,000.

The Board of City Commissioners, Boynton, Fla., is planning for the establishment of a municipal electric lighting plant.

J. J. Kane, Galveston, Tex., and associates, have acquired property on the north side of the Government dike for the establishment of a boat building and repair plant, specializing in barges, dredges and similar vessels.

The Board of Trustees, Crescent City, Fla., A. B. Harrison, president, is making inquiries for a new water tank and steel tower, of about 75,000 gal. capacity, and 75 ft. high.

A vocational department will be installed in the new three-story high school, 158 x 225 ft., to be erected at Orlando, Fla., estimated to cost about \$200,000. Bids will be asked in February. F. H. Trimble, Orlando, is architect.

The Mosehart-Schleeter Co., 211 Caroline Street, Houston, Tex., is having plans prepared for rebuilding its automobile repair and service works, recently partially destroyed by fire, with loss estimated at about \$35,000. Alfred C. Finn, Houston, is architect. H. C. Mosehart is head.

Milwaukee

MILWAUKEE, JAN. 23.

Experience the past week has strengthened opinion that the machine-tool trade is on the way to a definite revival. While local tool builders have not been favored with any conspicuous buying, nevertheless orders for one or two machines are coming in and the time is advancing rapidly when production will be resumed on more than a minimum scale. Encouragement has been lent by the reopening of the Gisholt Machine Co.'s plant at Madison, Wis., after a long period of minimum operations, to fill a rush order for special tools for the Western Electric Co., which will keep the plant busy until May 1. Peaks and valleys in the course of production as it follows the trend of orders are gradually being evened up. The development of new designs embracing more manifold purposes and the general efficiency of tools is occupying considerable attention and serves as a good bridge to connect busy and idle periods.

The Filer & Stowell Co., Milwaukee, manufacturer of sawmill and general heavy wood-working machinery, steam engines, etc., and owner of the Beaver Mfg. Co., maker of automobile motors, has started work on a new cupola house, 40 x 55 ft., at the main foundry. It will cost about \$25,000 complete.

The Dane County Board of Supervisors, Madison, Wis., has plans by Allan D. Conover, State architect, for a new power plant and boiler house, 40 x 98 ft., with a 135-ft. stack, conveyers, storage, etc., to cost about \$30,000, for the county insane asylum and almshouse at Verona. Bids will

On Feb. 16, Thomas W. Wilson, 512 West Wilson Street, Madison, is chairman.

George Engel & Brothers, architects, 114 Ogilvie Street, Milwaukee, have been engaged by S. A. Schneider to design a public garage and service building, 55 x 110 ft., two stories and part basement, to be erected at Twelfth and Harmon streets. Bids will be taken about Feb. 15.

The Perdieu Tool Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$75,000 to manufacture machinery, tools, etc. The incorporators are Rugley A. Perdieu, 464 Layton Boulevard; J. B. Matthews and Benjamin Poss, attorney, 120 Wisconsin Street. Plans of the corporation have not matured sufficiently to make possible a definite statement.

The Oshkosh Tractor Co., Oshkosh, Wis., organized nine months ago with \$1,500,000 capital stock to take over the business, equipment, etc., of the LaCrosse, Wis., Tractor Co., has indefinitely postponed the construction of its proposed new plant, foundations of which have been completed. Stockholders on Jan. 16 voted to dissolve the corporation and close up its affairs, owing to the inability to properly finance the enterprise. C. C. Shanor is secretary.

The Reliance Motor Truck Co., Appleton, Wis., is preparing to engage in the quantity production of a new design of rotary snow plow to supplement its present line of motor trucks. The device consists of a steel drum, 8 ft. in diameter, containing an auger, the whole mounted on runners attachable to the front axle of a motor truck or equipped to be pushed by a tractor.

Oconto Public Service Co., Oconto, Wis., is revising plans for improvements costing \$50,000 in its hydroelectric power plant and dam at Peshtigo, Wis. It is intended to begin work about March 15 or April 1. The engineers are Mead & Seaton, Madison, Wis. T. A. Pamperin is president of the company.

The Atkinson-Nash Co., Sparta, Wis., has plans for a two-story garage and service building, 50 x 98 ft., estimated to cost \$25,000.

The Oshkosh Auto Jack Mfg. Co., 176 Marion Street, Oshkosh, Wis., sustained an estimated loss of \$25,000 by fire which badly damaged its two-story factory on Jan. 18. It is planned to lease new quarters and purchase new equipment at once so that production may be resumed as early as possible. William Koeck is president and manager.

Canada

TORONTO, Jan. 23.

The demand for machine tools in this market is beginning to show renewed activity. Sales, however, are not numerous, but prospects for the early future have recently become very bright. Inquiries for equipment are coming forward in increasing numbers and dealers are of the opinion that it will only be a short time before buying will reach the normal stage. Manufacturers have been holding back orders for replacements purposes and have been buying only when absolutely in need of a machine, but the time is not far distant when it will be necessary to increase productive operations and have their equipment in good shape to meet competition not only from other Canadian producers but from American and European manufacturers who are making a strong bid for a hold in this market. A decided improvement has been noted in the small tool market the past week. Drills appear the main feature of demand, but other lines are also coming into more prominence.

The Beaver Machine Shop, 1110 Centre Street, Calgary, Alta., is asking for a lathe and gear cutter.

C. Lovatt, 1537 St. Denis Street, Montreal, is asking for a 25-hp. steam boiler.

The Mount Royal Arena, Montreal, is asking for equipment for an artificial ice plant.

The Union Natural Gas Co., Chatham, Ont., is in the market for piping, tools and drilling equipment for drilling wells, etc.

J. Grey, Maple Street, Collingwood, Ont., is in the market for machinery and equipment for a steel spring and steel specialty factory.

The foundry of McLean, Holt & Co., Fredericton, N. B., was recently damaged \$20,000 by fire. The molding shop suffered the greatest loss.

Dodd & Strothers, manufacturers of copper cable, etc., have arranged for the erection of a manufacturing plant at Windsor, Ont., on which construction will start soon.

The Industrial Supply & Service Co., Ltd., Vancouver,

B. C., is in the market for a double end punch and shear, capacity to $\frac{1}{2}$ -in., with about 24-in. throat; also nut making machine with capacity up to 1-in.

T. J. Moore, Warton, Ont., is the market for a double end matcher for hardwood flooring.

William Hendry and Thomas Ryan, Tacoma, Wash., propose to erect a factory at New Westminster, B. C., to cost \$9,000 for the manufacture of automobile accessories.

The Hydro Electric Power Commission, 43 Hughson Street, Hamilton, Ont., will erect an electric station on Ottawa Street, at a cost of \$100,000. Guy Long is chairman.

California

SAN FRANCISCO, Jan. 17.

August A. Wagniere, Los Angeles, has awarded a contract to the United Construction Co., 516 Baker-Detwiler Building, for a one-story machine shop, 40 x 135 ft.

The Board of Directors, Porterville Union High School District, Porterville, Cal., will build a series of vocational shops in connection with a new high school building, estimated to cost about \$275,000. Coates & Travers, Rowell Building, Fresno, Cal., are architects.

The Kroyer Motors Co., Stockton, Cal., is arranging for the erection of its new automobile plant at Los Angeles, estimated to cost in excess of \$150,000. It is said that work will commence in the spring.

The Board of Education, Long Beach, Cal., is taking bids until Jan. 30, for a new vocational building at the Polytechnic High School, estimated to cost about \$200,000. Bids for equipment will be taken later. John C. Austin, 1125 Baker-Detwiler Building, Los Angeles, and W. Horace Austin, First National Bank Building, Long Beach, are associated architects.

The Santa Fe Railway Co., Los Angeles, has completed plans for a new ice-manufacturing and car icing plant at Riverbank, Cal., 146 x 168 ft., with extension, 85 x 185 ft., estimated to cost in excess of \$75,000. The engineering department of the company is in charge.

The Joseph Musto Sons-Keenan Co., 1801 South Soto Street, Los Angeles, building stone products, has awarded contract to the Baker Iron Works, 950 North Broadway, for a new one-story mill, 114 x 157 ft. Finishing machinery, hoisting and conveying equipment will be required.

Seattle

SEATTLE, JAN. 17.

The new year has opened with a brisk inquiry in the hardware line, which has spread to machine tools without the inclusion of heavy duty machinery. Second hand stocks have become exhausted and will not interfere this season in the legitimate sale of new material. An order was placed the past week by one house for complete equipment of the B. C. Arnes line of automobile accessories.

There has been a better movement of drill presses than last year owing to the scanty shipyard stocks which are now non-competitive.

The Oriental export trade is improving, particularly in Japan, which bought a large number of air tools the past 10 days.

The Pacific States Rubber Co., Vancouver, Wash., recently organized is selecting a site for the erection of a plant. The first unit is estimated to cost about \$500,000, and the ultimate works in excess of \$1,000,000. A. M. Elliott, Vancouver, is president.

The Common Council, Bandon, Ore., has preliminary work under way for a municipal hydroelectric power plant to cost about \$80,000. The Miller Engineering Co., Burke Building, Seattle, is in charge.

The Columbia Tire Co., 1401 Northwest Bank Building, Portland, Ore., has acquired a site and plans the immediate erection of its new works. It will comprise four 90 ft. wings, with total frontage of about 350 ft., and is estimated to cost in excess of \$100,000, including machinery. R. A. Wurzburg heads the company.

The Oregon Lumber Co., Hood River, Ore. is considering tentative plans for a hydroelectric power plant for increased power supply at its works.

The Bonsteel Motor Co., Salem, Ore., will break ground in the spring for a two-story service and repair works, 60 x 130 ft.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Bands, base price	3.13c.
Beams and channels, angles and tees	
3 in. x 1/4 in. and larger, base	2.63c.
Channels, angles and tees under 3 in. x 1/4 in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	2.50c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger)	2.70c.
Toe calk, 1/2 x 3/8 in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	.625c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.40c.
Squares, flats and hex.	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

1/4 in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C R. One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	
Nos. 22 and 24	3.60c. to 3.85c.	4.10c.
No. 26	3.65c. to 3.90c.	4.15c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	3.80c. to 4.25c.	
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel

	Black	Galv.
1/2 in. Butt.	—56	—40
3/4 in. Butt.	—61	—47
1-3 in. Butt.	—63	—49
3 1/2-6 in. Lap.	—60	—46
7-8 in. Lap.	—56	—34
9-12 in. Lap.	—55	—33

Wrought Iron

	Black	Galv.
3/4 in. Butt.	—30	—13
1 1/4 in. Butt.	—32	—15
2 in. Lap.	—27	—10
2 1/2-6 in. Lap.	—30	—15
7-12 in. Lap.	—23	—7

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 1/4 c. to 17 1/2 c.
High brass wire	17 1/4 c. to 17 1/2 c.
Brass rod	14 1/4 c. to 15 c.
Brass tube, brazed	26 c. to 27 1/2 c.
Brass tube, seamless	18 1/2 c. to 19 c.
Copper tube, seamless	21 1/4 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21 1/2 c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Primes	Wasters
	"AAA"	"A"			
	Charcoal	Charcoal			
	14x20	14x20			
1C.	\$10.00	\$8.50	80 lb.	\$6.05	\$5.80
IX.	11.25	10.00	90 lb.	6.15	5.90
IXX.	13.00	11.50	100 lb.	6.25	6.00
IXXX.	14.75	13.25	IC.	6.40	6.15
IXXXX.	16.25	15.00	IX.	7.40	7.15
			IXX.	8.40	8.15
			IXXX.	9.40	9.15
			IXXXX.	10.40	10.15

Terne Plates

8-lb Coating 14 x 20

100 lb.	\$7.00
1C	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15 1/2 c.
Casting	15 1/4 c.

Spelter and Sheet Zinc

Western spelter	6 1/2 c. to 7c.
Sheet zinc, No. 9 base, casks	10 1/2 c. open 11c.

Lead and Solder*

American pig lead	5 1/2 c. to 6 1/4 c.
Bar lead	6 1/4 c. to 7 c.
Solder, 1/2 and 1/2 guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Rabbit Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6 1/4 c. to 6 1/2 c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	26c. to 28c.
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Old Metals

The market is sluggish with a tendency toward weakness. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.75
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, February 2, 1922

ESTABLISHED 1855

Swedish Steel Belt Conveyors

**Especially Adapted to Hot and Sticky Materials,
Which Cannot Be Carried on Rubber or
Fabric Belts—Lower Power Cost**

BY HARRY CARLSON

IN a recent engineering publication the following statement was made: "By means of belt conveyors large carrying capacity is combined with low power consumption. Belts usually take 50 per cent of the power used by other conveyors, so the problem of the engineer is really to see whether or not belt conveyors can be employed, as all things are in their favor." It is evident from this that belt conveyors are recognized for their efficiency, and a careful study of industrial conditions reveals the fact that they have been extensively used.

When a belt conveyor is mentioned, it is natural for the engineer to picture in his mind a canvas, balata, or rubber belt, because of their universal adoption. To speak of a steel belt conveyor immediately brings one into a foreign field, and questions arise, because of the fact that they have not been used in this country. But the Sandvik Steel Works, Sandviken, Sweden, with a wide experience covering about 50 years in the cold rolling of steel, have for 12 years been making steel belts to be used for conveying purposes.

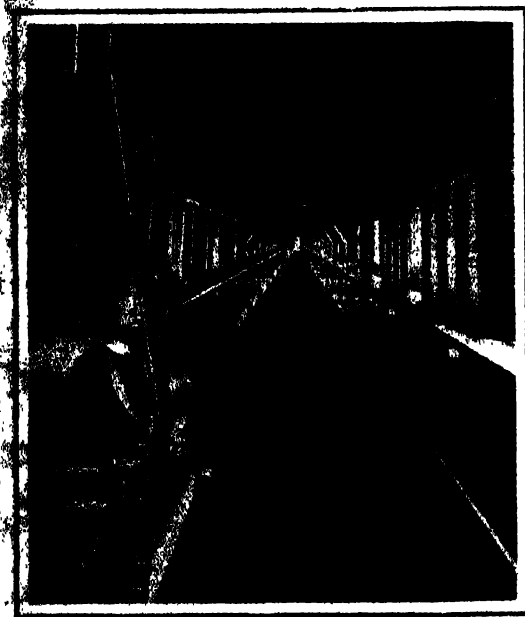
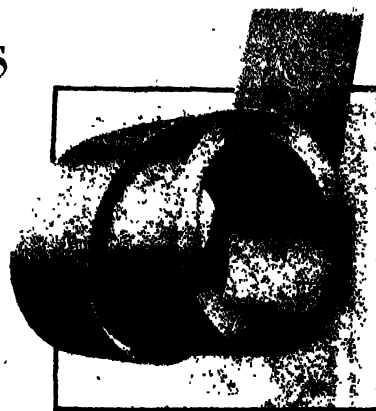
The flexible steel belt, known as the "Sandvik" belt, is made from Swedish charcoal steel with about 0.65 per cent carbon, cold rolled, hardened and tempered by a special process, which was originated by the company and perfected after years of conscientious application and experiment. The Sandvik works have always made

a specialty of cold rolled material, and for this purpose have acquired controlling interest in a number of the famous Swedish mines producing iron ores low in sulphur and phosphorus. It may be interesting to note that the expression "Swedish Steel" was originally applied to steel made from these ores.

To date, about 1300 steel belt installations have been made, for handling coal, coke, charcoal, iron ore, concentrated iron ore, copper ore, phosphate ore, sulphur ore, rock, warm calcium carbide, silica, warm dry clinker, ammonia, soda, etc., deals, battens, slabs, laths, chips and saw dust, brown sugar, sugar beet pulp, dried milk, yeast, dried vegetables, potatoes, chocolate, sacks of material, boxes, cases, packages, etc., clay, cement, and sands of various kinds.

Steel belt conveyors are especially suitable for conveying warm, sticky, sharp or abrasive material, which rubber and fabric belts cannot handle satisfactorily. The advantages of the steel belts over apron conveyors and wire woven belts are the elimination of heavy maintenance costs, power consumption and the spilling through joints and interstices.

The Sandvik belt has an especially hard, smooth



Installation of Steel Belt Conveyors at a Mine 45 Miles North of the Arctic Circle, Where Two 14-in. Belts Handle Iron Ore in Concentrate Mills



Coal Carried Up an Incline of 18½ Degrees by a Steel Belt Troughed Conveyor. Leather strips, riveted to the belt, insure against slipping

and dense surface, which accounts for its durability and high wear-resisting qualities. The belt, installed as a conveyor with standard size pulleys, is subjected to a working stress of 28,000 to 30,000 lb. per sq. in. when traveling over the pulleys. The manufacturing process also imparts properties that make it particularly adapted for conveying hot material. By special methods of heat treatment, hardening and tempering, this belt acquires better rust-resisting qualities than common cold rolled steel of similar composition.

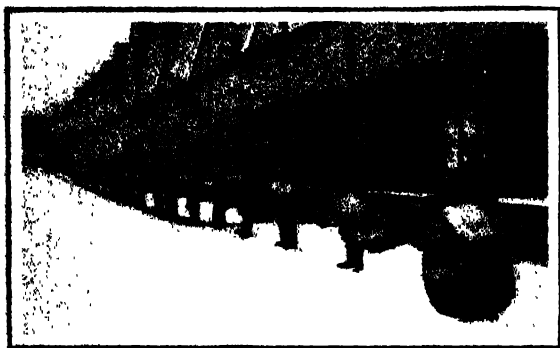
The successful application of the steel belt in the fertilizer industry also proves that it resists chemical



Adjustable Scrapers Make It Possible to Discharge Part or All of the Load at One or More Points, as Desired

action remarkably well. However, it is a well known fact that there must not be any free sulphuric acid present, nor any soluble sulphuric salt in connection with moisture, on account of the corrosive action of a weak solution of sulphuric acid on steel, especially when warm.

In the sugar, pulp, and lumber industries all over Scandinavia, where Sandvik conveyors are extensively used, the steel belts often run in the open air, subjected to the influence of rain, snow and sunshine, and



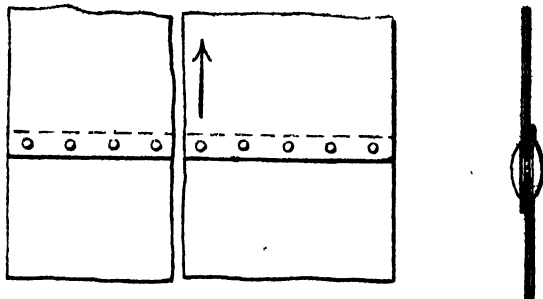
Steel Belt 285 Ft. Long, 16 In. Wide and 0.035 In. Thick, Weighing About 650 Lbs. This belt was cold rolled, hardened and tempered

have always been found to work well. The coating of rust that appears when such a belt is idle does not penetrate, but forms a thin film that protects the steel from further injury. When the belt is not in use for a considerable time, as is the case with the beet pulp conveyor, it may be found advisable to have it coated with a rust preventative.

As compared with flat rubber belts of the same width, the steel belt possesses greater transverse rigidity and therefore a higher capacity, as the edges, even

with a one-sided load, do not sag. This allows a relatively broader part of the belt to be used for carrying the load. These attributes are due to the fact that the steel belt is less flexible than the textile fabric.

Due to the unavoidable vibration in a textile belt while running, the material conveyed has always a certain tendency to spread, and therefore the width of

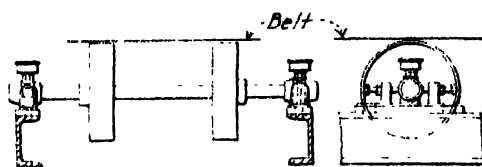


Riveted Joint for Steel Belt. The enlarged section shows form of button-head rivets

the loading area in most cases cannot exceed about one-third of the width of the belt. In the case of a steel belt, however, two-thirds of the width may be used without danger of spillage, because it runs so smoothly. This fact is also partly accounted for by the greater rigidity of the steel belt, which allows greater distances between the supporting rollers, thus less disturbance of the inertia of the material.

A special feature is the ease and simplicity with which material can be discharged at any desired point along the conveyor, without the use of cumbersome and expensive trippers. As the belt does not stretch, the tension devices are very simple, as they have to take up only trifling variations in length, caused by changes of temperature.

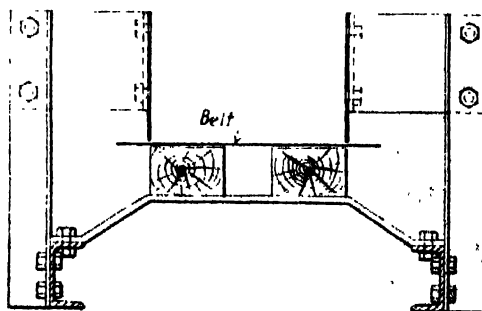
Through intimate co-operation between rolling mill, laboratory and technical men, frequently in touch with



Ordinary Type Idler Set Carrying Steel Belt

customers, manufacturing methods have been steadily improved, and the Sandvik flexible steel belt can now be obtained in one-piece lengths of up to 300 ft., for a width of 16 in. and a thickness of 0.035 in. The lateral deviation does not exceed 0.03 per cent. Before delivery all belts are carefully examined, both as to quality and straightness.

The Sandvik conveyor is designed in two ways,



Section Through Sliding Trough Steel Belt Conveyor

either with the conveying strand sliding on a wooden support, sometimes fitted with skirting boards, trough-like, the return strand being supported on idlers, or else both strands of the band are carried on rollers in the usual fashion. The sliding type, with or without skirting boards, is extensively used in Scandinavian

countries, especially in saw mills and wood-pulp mills, for carrying wood of every description, such as boards, logs, chips and sawdust, also largely for charcoal, etc. Little wear is caused in this type, even for conveyors of considerable length, as the surface of the wooden band soon acquires such a polish that the friction, and consequently the power consumption, are almost negligible.

In connection with heavy, hard and abrasive materials the roller supported type is preferable, the material being placed centrally on the belt and the edges left free, as is the general practice with flat band conveyors. Steel belts cannot be troughed like textile bands, which reduces their capacity for the same width, but this is partly compensated for since, as pre-

viously mentioned, a flat steel belt has a wider contact area.

It is obvious that the introduction of the steel belt has widened the field of application of the belt conveyor, for textile and rubber belts are not suited for conveying hot and sticky materials. Such sticky material as sugar, for instance, can be cleanly and efficiently scraped off. Sharp-edged cutting materials such as glass, can also be transported on this belt. Finally, material which on account of its high temperature cannot be handled on belts of rubber or balata, can be carried by the steel belt. All these advantages open up a wider field of usefulness for the belt conveyor, and should be welcomed by the engineer interested in the handling of materials.

Importance of Managerial Understanding of Welding

Study of the Conditions Necessary to Secure the Best Results—Checking Welders' Ability—Tests for Correct Welding

BY G. O. CARTER*

THE extent to which welding and cutting are employed in the major industries is not generally known. For example, there are 24 distinct uses of oxygen and acetylene, separately and as oxy-acetylene, in a steel mill. In some mills there are as many as 50 points where oxygen cylinders are supplied from the storehouse. Many other industries utilize welding and cutting in almost as many ways, and in many instances a single storehouse supplies a dozen or more shops of an establishment. The problems of distribution of the gases and the efficiency of application are, therefore, numerous.

Some managers may conclude, after reading this article, that welding and cutting are being fully utilized in their plants and that they are getting the best obtainable efficiency out of applications of these processes. Judging, however, from discussions of the subject with many executives, managers are just beginning to study welding and cutting. The tendency is definite, nevertheless, and it is attributable to the strides that have been made recently toward scientific standards in the matters of equipment, supplies, operative procedure and testing.

Study of established applications ought to interest almost every manager, and further use of the processes should result in large savings by replacing more expensive methods of production and by obviating the necessity for purchasing new equipment when breakdowns occur, to say nothing of reducing operating delays that are common in connection with mechanical replacements.

The whole history of welding is that its use so abundantly compensates the user that time spent in studying its applications is always paid back many times over. We must grant, however, that in the past there have been conditions which might justify managers in hesitating to use welding on some kinds of repair work, and the same considerations have warranted some doubt on their part concerning the advisability of some welding applications, such as the welding of pipe lines and pressure vessels. Fortunately, research and engineering have now surrounded welding with such practical safeguards in respect to correct practices and adequate tests that dependable results can now be definitely counted on; and the progress that has been made amply justifies conservative managers, however skeptical heretofore, in making a fresh investigation of modern welding as an operation capable

of improvement and development along standard lines of practice.

It is true that research and development have trailed behind the rapid growth in the use of welding and that the welder too often has been obliged to be a law unto himself—the judge of how his work ought to be done and of its final fitness. In the majority of establishments welding is the one industrial operation that the superintendent and master mechanic have been inclined to leave to the individual workman, or at the best to a foreman. Still, welding is very well managed in some plants and shops and it is these, rather than the less carefully managed ones, that show what welding can accomplish where correct practices are followed and when the managerial heads take advantage of late developments in welding the same as they do of advanced practice in other operations in their plants.

The day of managerial study of an attention to welding has definitely arrived, though tardily, as compared with cutting. Oxy-acetylene cutting differs from welding because the cutting jet is the equivalent of a machine tool; it will cut iron or steel where it is directed. The cutting process is one which saves a great deal of irksome manual work in cutting out rivets, severing plates, bars, shafts, etc., and, outside of its economy, is very popular with mechanics. The cutting process has quite naturally taken its place in production work in foundries, boiler shops, structural shops and similar places, and has therefore received considerable managerial attention, but even with this process altogether too much has been left to the operator.

Checking the Ability of Welders

Welders can and should be checked regarding their personal ability. Very simple tests soon indicate whether an operator of the welding torch is capable of making satisfactory welds. If he is working on steel plates, pipe or sheets, sample welds in the form of test coupons can be pulled in a physical testing machine and positive results noted. Average operators should produce welds stronger than 45,000 lb. per sq. in. and very good operators better than 55,000 lb. per sq. in., using Norway iron filling wire and joining sections of average boiler plate. What engineer would not be impressed by such results as compared with the strength of riveted construction?

Should a pulling machine not be available, a welded coupon may be tested by bending in a vise. The weld should be level with the face of the vise and the test

*Consulting engineer, Linde Air Products Co.

piece should be bent toward the side from which welded. A good weld will bend at least 90 deg. in heavy strips, or to 90 deg. in sheet steel welds. This test is easy to make and has been used for years in checking welding ability.

Employers should not be disappointed if their supposedly best operators sometimes fail to make good test bars. A little study will reveal the causes of failure, and point the way to avoid or correct them; and this only emphasizes the necessity for ability tests at reasonable intervals. By pursuing this course, managers can make sure that their welders are capable before assigning them to important work. But dependence on the ability of welders should be supplemented, whenever feasible, by the testing of their completed work.

It is generally admitted that welding is a thoroughly sound practice if properly done, but in some quarters there is an erroneous impression that it is almost impossible to know when welding is properly done. Therefore, although welding is giving better results than any other form for joining iron or steel pieces, it is not used to anything like the extent that it should be used. Getting proper welding is up to plant managers. Managers should make sure that their welders are capable of doing excellent work and see that they do it. Welders should be supplied the means of producing sound welds (one of the prime essentials is high-quality filler rods) and their work should be checked by as severe tests as possible. If these things are done, the high quality of the resulting work will be assured.

Welding Ammonia Receivers

As an interesting illustration, attention is called to one of the many large industries where welding has grown to be essential—making ammonia receivers for refrigeration plants. Riveted seams in ammonia receivers gave no end of trouble before welding was introduced; but, in taking up welding, the refrigeration industry had to insist on high quality work, as leakage of ammonia is very objectionable. Throughout this industry the necessity of checking the work of operators is recognized. Managers, superintendents and foremen make it their business to know about welding and the handling of welders and thus assure dependable welds. The result of this application, after the welding of tens of thousands of receivers, has been to firmly establish confidence in welding in the refrigeration field.

Welding of enameled tanks, the welding of rear axle housings for automobiles and auto trucks and many other interesting branches of industry in which welding is now a recognized production factor might be noted; but they would only serve to illustrate one or more properties that, in the welding of ammonia receivers, have been highly developed—the gas tightness of joints that must not leak, the strength of joints that must not yield under high internal pressure, resistance to fatigue and vibration under internal tension. It was but a logical step from ammonia receiver welding to general pipe welding as now practiced—the welding of gas pipe lines, oil pipe lines, water pipe lines and steam pipe lines.

Tests to Determine Correct Welding

Now let us consider some of the tests that can be employed to prove that any given piece of welding work is right. Industry is convinced that wherever hydrostatic pressure in excess of the working pressure can be applied it should be utilized as part of the test. While the pressure is on the work, repeated blows of a suitably weighted hammer should be given to the welded section. If there is a serious defect in the weld, this combined pressure and impact test will show it up. What manager would be in doubt as to the

strength and durability of welded pipe lines, storage tanks or pressure vessels that had passed a test of double the proposed working pressures and then hammered?

A feature of one other form of welding will be touched upon, as it offers big returns to the managers utilizing it. Repair welding of castings, no matter how large, can be made almost 100 per cent successful provided proper preheating and annealing facilities have been used as an important part of the work. Broken castings can thus be repaired in a fraction of the time that would be required for replacement and at a cost far less than that of replacement or of any other method of repair. There are single establishments having repair welding shops that average one big welding job a day, effecting the saving of tens of thousands of dollars yearly. Such shops should be as well organized and equipped as a machine shop or a foundry and have adequate preheating and annealing facilities.

Engineering Advice Available

Any investigation of the possibilities of the welding and cutting process as time and money savers should include the engineering advice which is available to those who seek it. Many of the manufacturing and supply companies maintain engineering and research departments. These devote their attention exclusively to the problems which come to them from the users' own work, and to the developments of the industry through aid rendered to present and potential users of gas welding and cutting. Standards of practice based on a contact with actual work being done in hundreds of plants have been well developed.

A large amount of information from these engineering and research activities as well as specific applications are featured by the trade journals which are devoted to the welding industry and other papers. These journals should be utilized for keeping abreast of current developments.

Because the oxy-acetylene process is a comparatively new tool in the hands of American industry, many users of the process are not fully aware of the tremendous strides that have been made in the direction of those standards of practice, tests, etc., which have marked the progress of other processes or operations that are to-day taken for granted as being in sound practice in every respect. There is hardly any feature of plant management and operation where time spent in study will pay as large dividends as in this field.

Luxemburg's Recovery in Iron

Luxemburg previous to the war was no small factor in the world's output of steel and iron, ranking equal to Belgium in 1912 and 1913. Like Belgium, it suffered severely from the war's devastation and its recovery in productive efficiency has been slow. In the first ten months of 1921 pig iron and steel output reached an average of 76,180 and 59,690 gross tons per month respectively. In 1920 the figures were 58,000 tons per month for pig iron and 49,000 tons for steel. In 1913, however, Luxemburg produced 209,000 tons per month of pig iron and 109,000 tons per month of steel. In the last two months reported—September and October of 1921—the recovery had reached more than 90,000 tons per month for pig iron and nearly 80,000 tons per month for steel, considerably exceeding Belgian output and nearly twice that of Canada.

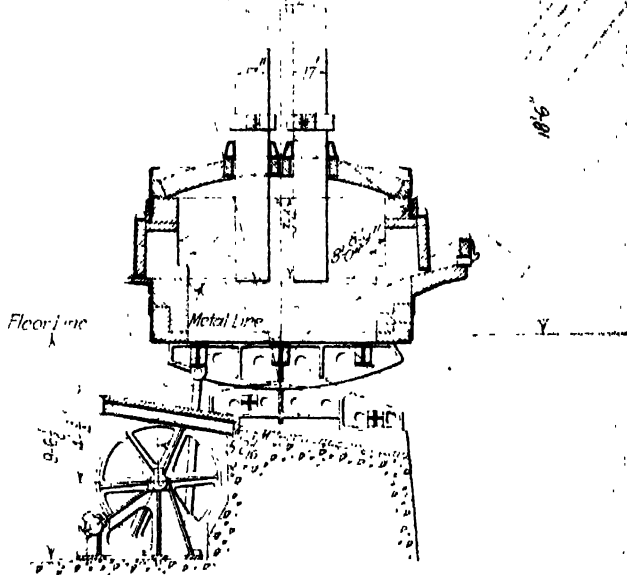
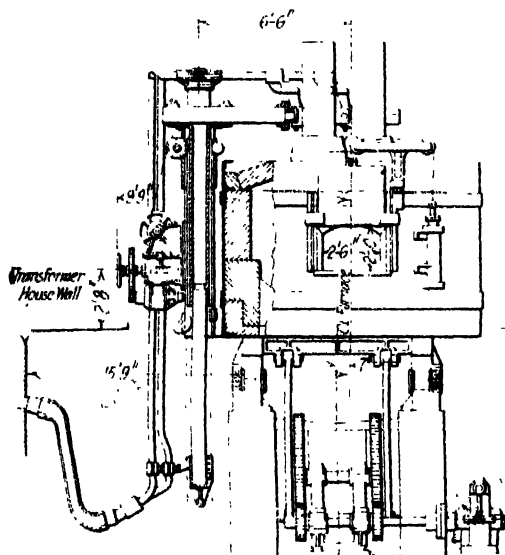
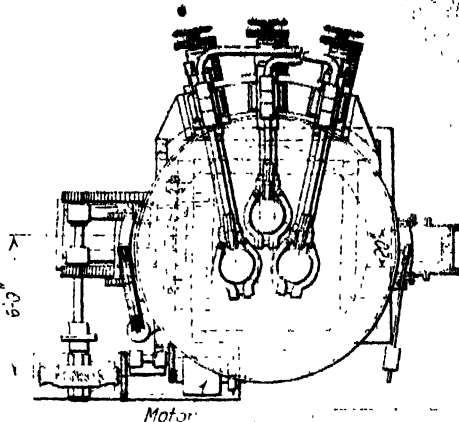
The Bessemer Limestone & Cement Co., Youngstown, Ohio, has contracted to supply the flux stone for the blast furnace of the Trumbull-Cliffs Furnace Co. over the first half of the year at the rate of 2000 tons weekly. The company has sold upwards of one-sixth of its maximum output of cement for delivery this year.

NEW 7-TON HEROULT FURNACE

Details of Design Capable of Employing Mechanical Instead of Hand Charging

A new type of Heroult electric steel furnace has been designed by the American Bridge Co., 30 Church Street, New York. It is a 7-ton furnace, details of which are reproduced in the illustration. It is a departure from the other standard type of 1, 2, 3, 6 and 15-ton capacity in that arrangements are made for the use of a mechanical charger. A description of the new 7-ton type, furnished by the company, follows:

The lift of the electrode is extremely high and makes it possible to use a mechanical charger or scrap buckets without the possibility of breaking electrodes. The clearance is lower than in the



earlier furnaces and the only consideration to be taken into account for the crane height is the service for the electrodes. In case the furnace is located on a platform, the transformer can be placed underneath the furnace floor, giving a clear floor for working purposes. The furnace can be built either with the electrode supporting mast opposite the spout with two side doors or with the mast on the right or left side, with the charging door opposite the spout and one smaller side door.

The furnace shell is of the usual strong cylindrical construction, placed on rockers of special curvatures. In tilting the furnace the spout travels downward and slightly forward. It is therefore possible to rest the

ladle underneath the spout in pouring the heat. The tilting mechanism is located in a comparatively shallow pit underneath the charging level out of danger of damage. The tilting mechanism is of rugged construction, operated by a powerful electric motor. The electrode winches with their motors as usual are located on the electrode supporting mast, with the minimum length of steel cable for lifting the electrodes. This feature is important, as there must not be any lost motion between the winches and electrodes, in order to obtain good current regulation. In regulation the electrode is frequently moved only a small fraction of an inch at a time.

Inquiry as to International Harvester Co.

WASHINGTON, Jan. 31.—The Senate has adopted a resolution offered by Senator Norris of Nebraska, directing the Attorney General to inform the Senate what action, if any, is contemplated by the Department of Justice to bring about a modification of the decree of the court against the International Harvester Co. Senator Norris in his resolution contends that the consent decree agreed to on Nov. 2, 1918, by Attorney General Palmer provided that the International Harvester Co. should divest itself merely of certain minor and unprofitable properties. The resolution says that the report of the Federal Trade Commission under date of May 4, 1921, shows that the consent decree would leave the dominant elements, the McCormick and Deering plants, still in possession of the International Harvester Co., and would not result in effective competition and in reduced prices of farm implements to the farmers.

The resolution also contends that it is necessary to

procure complete separation of the McCormick and Deering interests, and calls upon the Department of Justice to make known what plans, if any, are contemplated to bring about a modification of the decree in order that it may comply with the judgment rendered by the court. In case such course is not practicable, the resolution says it is desired to know whether the Department of Justice contemplates any other independent action against the International Harvester Co. "for the purpose of eventually restoring competitive conditions between the various corporations" of the International company.

It is planned to put into operation this week two more sheet mills at the new plant of Follanshee Bros. Co., Pittsburgh, at Toronto, Ohio. This plant started up Jan. 16 with the operation of its bar mill and two sheet mills. No steel yet is being made at this plant, which for the time being is served from the company's original unit at Follanshee, W. Va.

Preparing and Distributing Powdered Coal

Modern Seamless Steel Tube Plant Adopts Pulverized Coal as a Fuel—Details of System in Use for Furnaces and Boilers

BY E. C. GREISEN

SELECTING the proper fuel for a plant containing a variety of furnaces requires a thorough knowledge of the combustion of the various fuels available, temperatures employed, adaptability, and cost per B.t.u. or per ton of finished product produced.

Two methods are available for obtaining approximate data, one being a careful observation and study of data on existing installations, and the other, actual experiment. The Detroit Seamless Steel Tubes Co. engineers chose the latter method. Pulverized coal appearing to be the fuel best adapted to meet their requirements, they installed, in the early part of 1918, experimental equipment for firing one 4-door annealing furnace at the West Jefferson Avenue plant. The results obtained demonstrated the advantages of pulverized coal over other forms of fuel they were using, and it was therefore incorporated in the plans for the new Warren Avenue plant. After a careful inspection of several recent pulverized coal installations the order for the complete coal crushing, drying, pulverizing, distributing, storing and burning equipment was placed with the Allis Chalmers Co. in June, 1919.

Two important factors enter into the success or failure of any installation: First, the selection of the best equipment obtainable; second, the erection and operation by competent engineers. As minor changes are required on all installations of this type, in order to obtain maximum efficiency, too much care cannot be taken in the selection of the engineers and operators.

A brief description of the flow of coal in this system from the track hopper to the high-pressure distributing tank is best explained by reference to the sectional diagram of the system.

From the coal car (1) the coal flows into track hopper and thence through feed hopper onto pan conveyor (4). The latter forms a feeder for the spiked tooth crushing roll (5), the conveyor and crusher being

driven by a motor (6). The spiked tooth crushing roll reduces the run of mine coal to $1\frac{1}{4}$ in. and finer.

From here the coal is spouted to elevator (7) and then into conveyor (8) which distributes the coal over bunker (10). Bin gates (11) permit the coal to flow onto belt conveyor (12). The bin gates are made adjustable, to regulate the height of the ribbon on the belt conveyor. At the head end of the belt conveyor is a coal disintegrator (13) which reduces the $1\frac{1}{4}$ -in. coal to $\frac{1}{2}$ in. and finer. The coal, then being of proper size for economical drying, passes into an Ebro type dryer (14), discharging thence through hood (20) to feed spout (21).

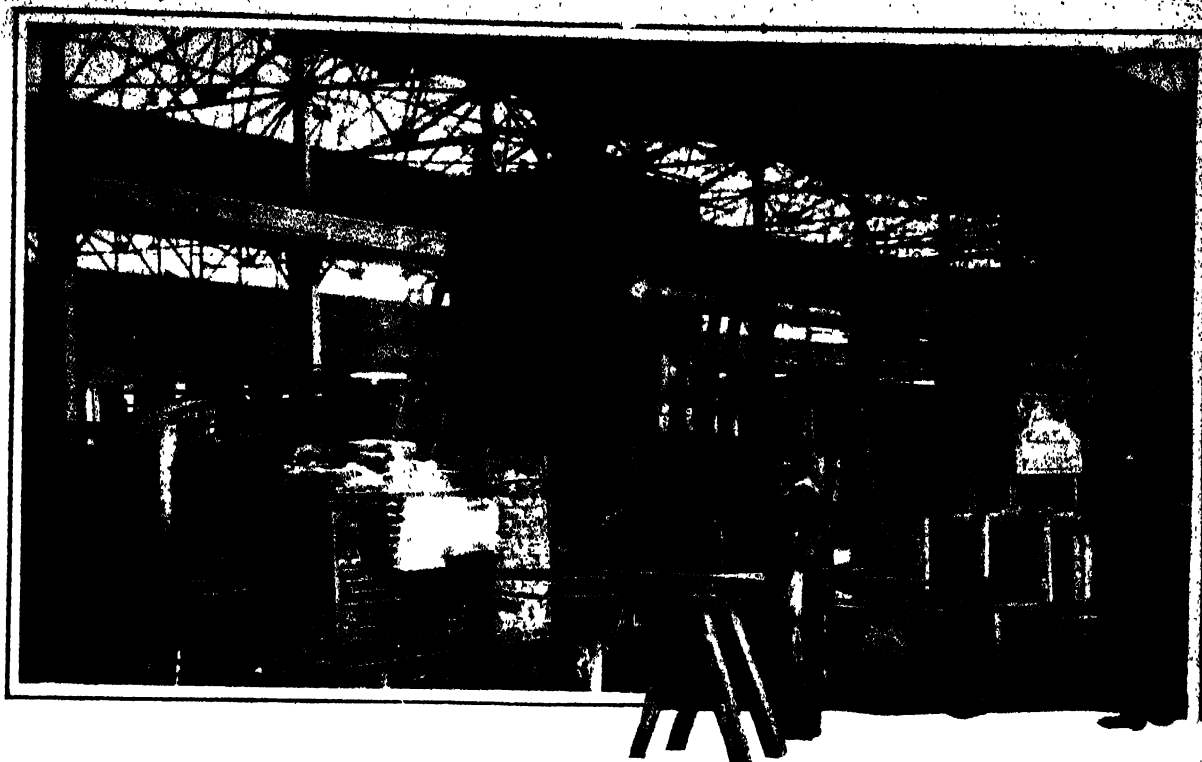
The products of combustion are removed from the dryer by exhauster (15) and conveyed to cyclone collector (17) through a pipe. Coal dust, which is held in suspension by the draft through the dryer, is removed in the cyclone and spouted to the bin. The belt conveyor under the bunker, exhauster, disintegrator and dryer are driven through countershaft from a motor (18).

Stack (19) has a damper, which is closed when dryer is in operation, and open during standby period, to permit escape of the products of combustion. Elevator (22) driven by motor (23) raises the dried coal to dried coal bin (24). Feeder (25) regulates the flow of coal to the compeb mill pulverizer (26), the pulverized coal discharging through casing (27) into pulverized coal elevator (31) through spout (30). Feeder and compeb mill are driven by motor (28).

Elevator (31) driven by motor (32) raises the coal to storage bin (33), from which it flows by gravity into a high-pressure coal tank (36), through rotary coal gate (34) and high-pressure coal valve (35). The high-pressure coal tank rests on a scale, the connections from tank to storage bin and distributing line (45) being flexible. The high-pressure coal valve and ro-



Six Tube-Annealing Furnaces, with Storage Bins, Feeders and Air Supply Equipment. Served by High-Pressure Distributing Line



Pointing Furnaces Using Pulverized Coal as Fuel

tary coal gate are operated by levers. The two-way valve (41), operated through chain (42), directs the flow of coal to either distributing line

Distribution of the Pulverized Coal

In the plot plan are shown the distributing lines leading to the various bins at the furnaces and boilers. A $\frac{3}{4}$ -in. air line, with connections at intervals to 3-in. distributing line, is used to free coal line if it should become clogged. Switching valves located near storage bins permit filling of bins through branch lines. The distributing lines from the coal plant to the main building are placed under ground, to eliminate interference with the operation of the yard crane.

Coal for the piercing mill is injected into the combustion chamber by three screw-type coal feeders, driven through adjustable friction disks from a common constant speed motor. Contrary to common practice, the air for combustion is supplied by one blower. A 10-ton capacity steel bin allows for sufficient storage for a day's run.

Each annealing furnace is supplied with coal from a $2\frac{1}{2}$ -ton bin, and the necessary air for combustion for

the six furnaces from a single blower. The required amount of air for each burner is regulated by means of a slide gate

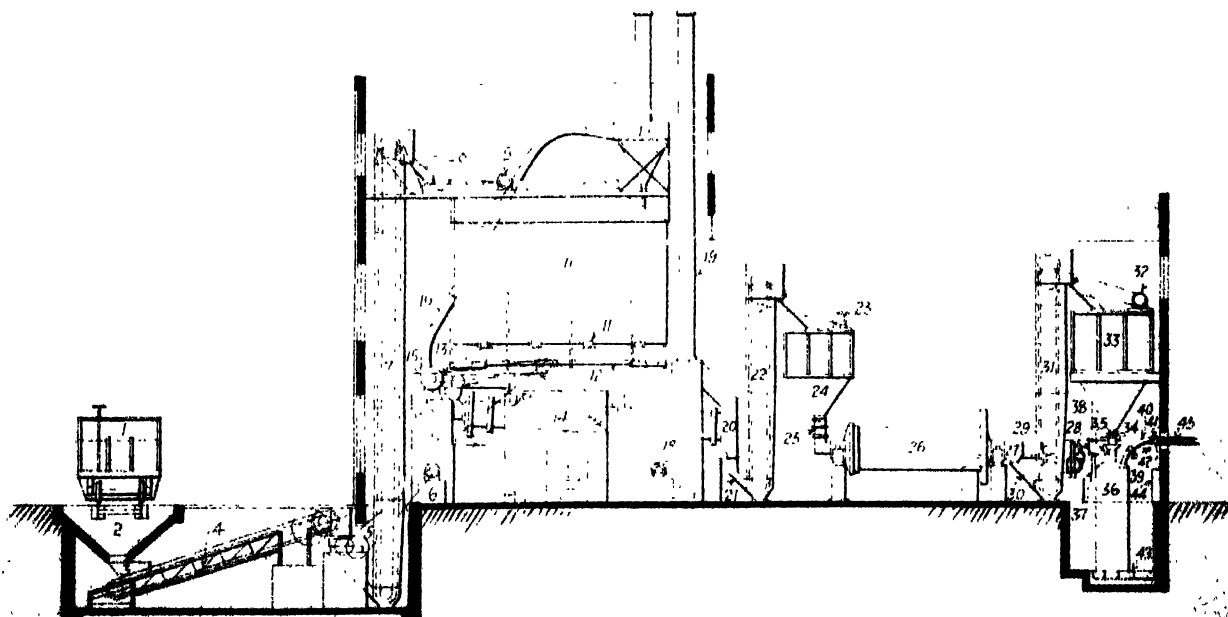
The pointing furnaces receive their supply from a $2\frac{1}{2}$ -ton bin, and the necessary air for combustion is furnished by a No. 4 type "P" American Blower Co. blower.

A 10-ton bin at the boilers supplies both the 180-hp. and 300-hp. Erie City boilers, the 300-hp. boiler being equipped for use only in case of emergency. The flues from the annealing furnaces enter into a common flue, and dampers permit passing the gases through the 300-hp. boiler or to the stack. This boiler is used for heating the buildings, and the 180-hp. boiler for supplying steam to the pickling vats and service pumps.

The coal pulverizing plant has a guaranteed capacity of 3 tons per hour, and under normal operating conditions 10-hr. operation furnishes sufficient fuel for the entire plant for 24 hr.

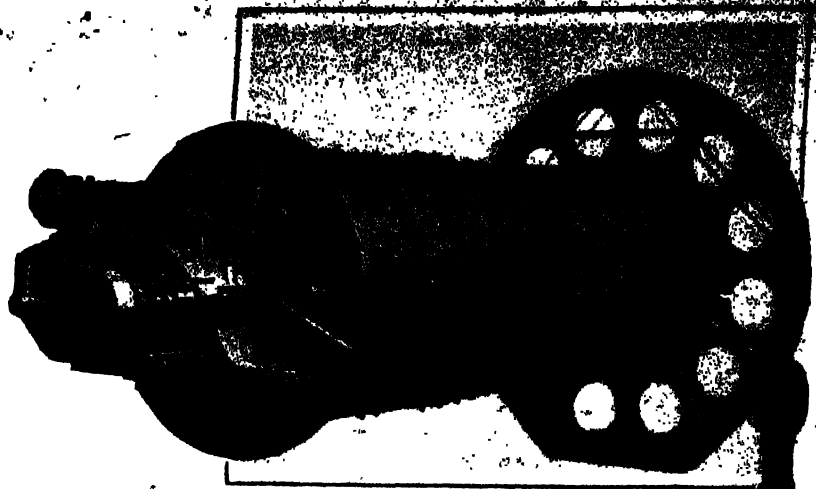
Coal Drying

The low temperature at which distillation of the volatile matter in coal occurs requires a dryer designed



Cross Section Through Preparation Plant, from Receiving Hopper at Left, Through Bunker and Dryer in Center, Pulverizing Mill and Pressure Tank at Right

Some Idea of the Size of the Compeb Grinding and Pulverizing Mill May Be Obtained from the Man Along-side. The shell is made of heavily riveted steel plates.

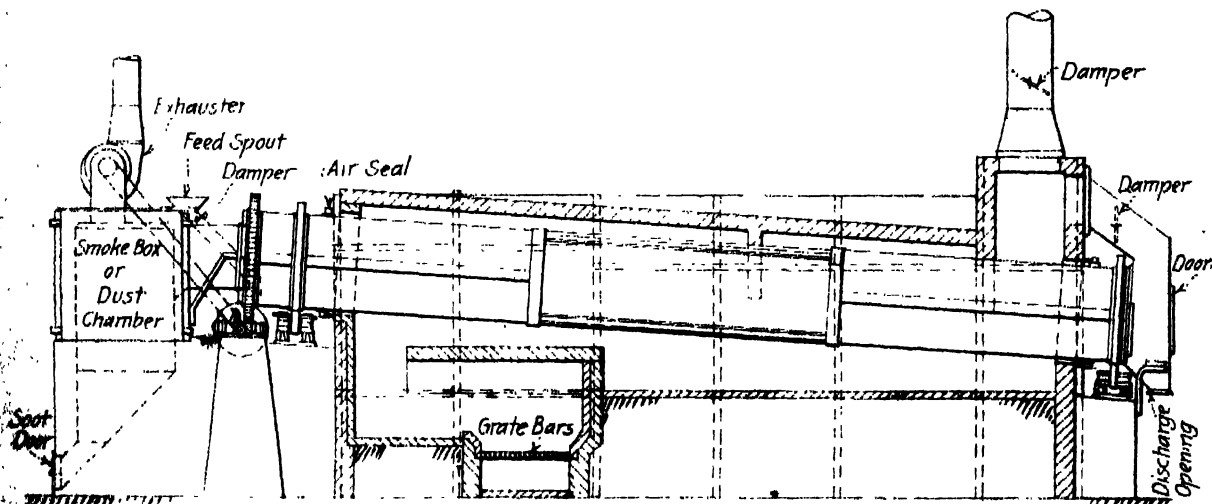


to meet this condition. In the Ebro or inclosed type of indirect-direct heat dryer, the shell is inclosed in a brick housing with the grates or combustion chamber located at the feed end of the dryer. The hottest flames are diverted from immediate contact with the shell by means of a protecting arch, and pass through the housing to the discharge end, heating the shell externally. The gases, considerably cooled, then pass

cyclone collector connected to the atmosphere by a stack.

Coal Grinding

A compeb mill, as shown, pulverizes the coal to a fineness of 90 to 95 per cent through a 100-mesh screen. The preliminary grinding compartment is lined with 3-in. chilled iron plates, the grinding media being



Ebro Type of Rotary Dryer for Pulverized Coal

to the interior of the shell through a hood at the discharge end.

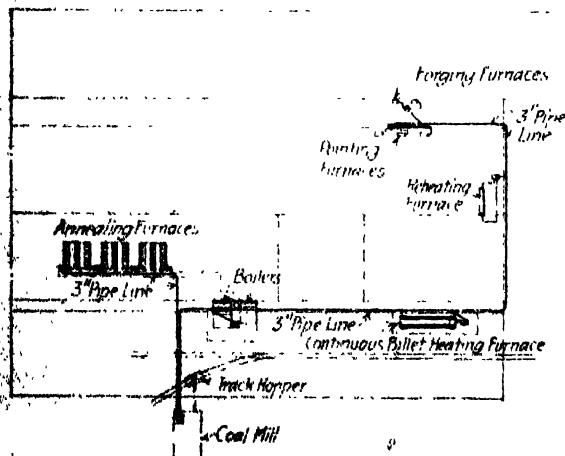
"I" beam lifters placed in the dryer shell shower the coal, thereby permitting the hot gases to come in contact with each particle of coal. The moisture laden gases are drawn from the shell by an exhauster connected to the feed end housing, and discharged into a

forged steel balls ranging in size from 2½ to 4 in. in diameter. The grid frame type division head retards the flow of coal to the finishing compartment, until it has reached a fineness that will allow it to pass through between the grid bars. The grid bars, made of tool steel with ends upset and ground for specified openings, are held in position by manganese keeper rings and manganese division plates. The cast spiral in the grid supporting frame advances the material to the lifters, which discharge the coal onto a central cone and into the finish grinding compartment.

The fine grinding compartment is lined with 1¼-in. chilled iron liners and charged with 1¼-in. diameter concave as a grinding medium. The discharge from the mill is accomplished by placing perforated manganese steel plates, lifters and a central discharge cone at the discharge end. As the mill operates in a horizontal plane, the quantity of material fed to the mill regulates the fineness, to a large extent.

Blowing the Coal

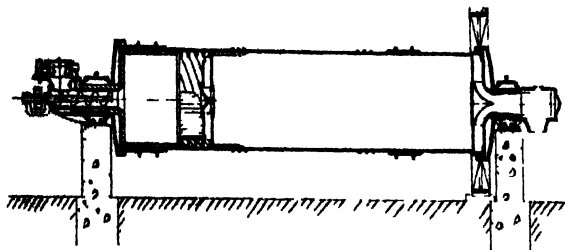
During the filling period the rotary coal gate, high-pressure coal valve and vent valve of the high-pressure blowing tank are open, the high-pressure air line valve and straight way valve being closed. When the scale indicates the required quantity of coal in the blowing tank, the rotary coal gate, the high-pressure coal valve and vent valve are closed, in the order named. The high-pressure air line valve is then opened and pressure in tank brought up to air receiver pressure. When



Layout of Pipe Lines and Connections to Distributing System at Plant of Detroit Seamless Steel Tube Co.

The two-way valve set for the proper distributing line, the straight way valve is opened, and coal delivered to any desired bin by setting the two-way valve at the bin before blowing.

The system works on the injector principle, the amount of air required per pound of coal being proportional to the pressure used and the distance the coal is to be transported. The outer pipe, which surrounds the injector pipe inside the blowing tank, is adjustable, and maintains a clear passage for the air

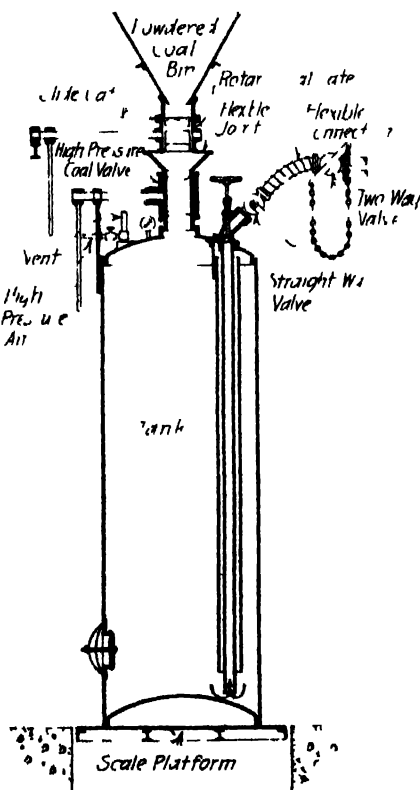


Longitudinal Section Through Comp. b Mill Which Pulverizes the Coal

from the inlet valve to the injector pipe at bottom of tank. The greater the distance from the end of the outer pipe to the injector pipe, the greater is the proportion of coal to air.

To obtain maximum efficiency, adjustments should be made on each installation until only sufficient air is used to transport the coal the maximum distance without clogging the line.

If the operator wishes to transfer part of the coal



Pressure Tank and Connections Showing Method of Operation

with the blowing tank to another bin, the straight way valve is closed and the purge line valve opened to clear the distributing line. The two-way valves at the furnaces are then adjusted and the straight way valve opened. The amount of coal conveyed to each furnace is weighed, permitting accurate records of consumption per ton of finished product for each operation.

At the regular monthly meeting of the Detroit Chapter of the American Society for Steel Treating, Monday evening, Jan. 23, Henry Traphagan, consulting metallurgist, Toledo Steel Castings Co, Toledo, Ohio, discussed "Furnaces in Steel."

Metallurgical Coke by Froth Flotation Process

The beneficial effect on the physical strength of metallurgical coke made from coking coals after treatment by the Froth flotation process of cleaning has been further demonstrated by practical trials that have taken place in South Wales under the supervision of Minerals Separation, Ltd., according to Ernest Burt in the London Iron and Coal Trades Review. The results of one of these tests are set out in Table I:

Table I Test of Metallurgical Coke Made from Coking Coals Cleaned by the Froth Flotation Process

Analysis etc	Coal	Flotation Coke	Ordinary Coke
Ash (per cwt)	4.50	6.00	...
Sulphur (per cwt)	0.97	1.14	...
Volatile matter (per cwt)	20.61	0.29	...
Moisture (per cwt)	11.45	0.86	...
Specific gravity		1.39	...
Porosity		1.40	...
Crushing strength (lb. per sq. in.)		2,076	1,500 and under

Further research has demonstrated that, where the coking properties of a coal are neutralized by the presence of fusain, differential flotation may be applied for removal of the latter, leaving a residual fuel strongly coking in character. Success in this direction is shown by the series of semi-commercial tests on Scottish coals given in Table II, which before treatment were very inferior in coking properties (the coking constituent thus separated is denominated bright in the table).

Table II Samples of Coke Made from Scottish Coals After Treatment by the Froth Flotation Process

Material	Weight	Moisture	Ash	Analysis	Volatile Matter	Coke
Product	Per Cent	Per Cent	Per Cent	Btu	Per Cent	
Original	100.0		7.71	11,273	34.82	
Bright	50.0	8.0	4.31	11,760	26.12	Good
Dull	50.0		10.16	12,477	25.73	...
Original	100.0		17.8	12,061	22.36	
Bright	70.0	15.0	17.6	14,561	26.52	Very good
Dull	30.0		50.08		17.92	...
Original	100.0		8.30	12,477	25.54	
Bright	71.7	6.4	1.90	17,273	23.60	Good
Dull	28.3		11.78	12,640	22.69	...
Original	100.0		8.30	13,075	24.66	
Bright	71.3		4.14	13,050	31.37	Very good
Dull	28.7		11.58	12,877	23.21	...

This section of the research is in its early stages, and it is not yet to be inferred that the minerals separation processes are applicable to all non-coking coals for obtaining a coking product. It may, however, be taken as established that, where the non-coking properties of a coal are due to the presence of fusain, the fusain can be removed leaving an excellent coking product.

This discovery marks a new stage of development in the preparation of metallurgical fuels. Many iron ores are at present unexploited owing to a dearth of coking coal, and the differential method may well lead to far-reaching economic developments in those countries at the moment industrially impotent in so far as concerns coking coal.

Building Construction in 1921

F. W. Dodge Co. reports that the total amount of construction contracts let in the 27 Northeastern States, during 1921, amounted to \$2,359,018,000, which is about 8 per cent less than the \$2,565,000,000 of 1920. The character of construction differed markedly from the previous year, for 37 per cent of the total, or \$880,052,000, represented residence building, an increase of 54 per cent over 1920. Industrial buildings dropped to 7 per cent of the total, at \$173,325,000.

The Kentucky Refractories Corporation, Russell, Ky., plans shortly to erect a plant at Russell. The first unit is to have a daily capacity of 75,000 standard brick. The corporation has 3000 acres of clay lands adjacent to the plant location. The officers of the corporation are: C. K. Turley, president; R. T. Hipp, vice-president and general manager, 1016 East Main Street, Massillon, Ohio, and A. J. Ivey, secretary and treasurer.

TO RELIEVE FARMERS

Many Remedies Proposed at Agricultural Conference at Washington

WASHINGTON, Jan. 31.—The iron and steel industry, as is the case with regard to all other industries, as well as the financial and commercial life of the nation, recognizes the necessity of restoring the purchasing power of the farmer in order to bring about a return of normal business conditions and this is the outstanding feature which gained attention at the conference here last week of agricultural interests of the country, called by President Harding through Secretary of Agriculture Wallace. It obviously remains to be seen what the actual results of the conference may be, but there was confident hope expressed by many delegates who attended that a constructive program was adopted which at least aimed in the right direction. This opinion disregarded some of the artificial and absurd remedies suggested, and also discounts the activities of "blobs" and disgruntled groups, which, as was to be expected, were present. At the same time, there are those who have grown skeptical of the advantage to be gained by conferences, hearings, investigations, etc., which, despite their numbers in the past, appear to be more numerous than ever until many consider there is a positive plethora of them, some of which frequently do more harm than good. It is pointed out that some of these undertakings seek to fly directly in the face of natural economic laws and consequently can do injury only, instead of either permitting such laws to work their way alone, or to assist them by sane methods.

Delegates to the agricultural conference insist that they have resorted to the latter course, and, for one, have done good by focusing the attention of the nation upon the depressed condition of agriculture as could not have been done in any other manner.

Recommendations made included:

Passage by Congress of laws providing intermediate credits for farmers through commodity financing, pending which the War Finance Corporation would be continued.

Amendments to the Federal Reserve and farm loan acts to provide easier and freer money for farmers.

Investigation by Congress of the subject of crop insurance.

Constitutional amendment prohibiting issuance of tax free securities except bonds and other obligations of Federal farm loan banks.

Reenactment of an excess profits tax and equal consideration for agriculture with other industries in any tariff policy. Opposition to any consumption, sales or manufacturers' tax.

Representation by the United States "in a conference with economic and financial reconstruction of Europe" in order to learn what the United States can do regarding the re-establishing of international credit.

Reduction of freight rates on farm products, live stock and products of allied industries to the level existing before the general rate advance of Aug. 26, 1920, and restoration of certain rate-making powers to state railroad commissions.

Readjustment of rates on other commodities to follow as quickly as possible.

Legislation to prevent the railroads from including the "land multiple" in making up their revaluations.

Development of the Mississippi, Ohio and Missouri rivers as arteries of commerce and establishing of joint water and rail rates.

Opposition to repeal of the Panama canal tolls.

Development of hydroelectric power projects to make current available to the smaller consumer on the farm and in the village and closer co-ordination of railroad, waterway and highway transportation.

Appointment of a commission urged to work out a national land policy, including reclamation, irrigation, grazing and colonization problems in co-operation with similar bodies in the various states.

Participation by railroad labor and railroad corporations in the general price "deflation."

The last named recommendation was adopted after the conference voted to strike out a recommendation for the repeal of the Adamson eight-hour law and the "bringing down" of wages of railroad and industrial labor to a parity with returns received by farmers, which had been urged by President Stackhouse of the Implement Manufacturers' Association. President Samuel Gompers was the principal opponent to the recommendation urged through Mr. Stackhouse. The

substitute adopted was declared by one delegate to be a "milk and mush" affair.

The conference also approved a proposal that the St. Lawrence-Great Lakes waterway project be completed and after a heated debate took favorable action on the proposal to repeal the 6 per cent guarantee clause of the Esch-Cummins act.

Some of the recommendations adopted are opposed by industrial and other interests of the country and undoubtedly will be fought if they are put in the form of proposed legislation. Among them are those which are considered paternalistic and calling for distinctly class legislation. One is the recommendation for a constitutional amendment, unlikely of passage if it ever comes before Congress, prohibiting issuance of tax free securities "except bonds and other obligations of Federal farm loan banks." Another is the recommendation for reenactment of an excess profits tax while still another relates to the opposition of the conference to any consumption, sales or manufacturers' tax.

Timber Men Behind Great Southern Steel Corporation

The identity of some of those financially interested in the Great Southern Steel Corporation has been disclosed. This company, incorporated in Delaware with capital stock of \$105,000,000, and later granted a charter in Alabama with capital stock of \$500,000, as announced in THE IRON AGE on Dec. 15 and Jan. 12, plans to develop 101,000 acres of iron ore and coal lands located about 65 miles from Muscle Shoals. Among those interested in the company and mentioned as probable directors are P. M. Starnes, 208 South La Salle Street, Chicago, who has large timber holdings in various parts of the country; J. S. Stearns, lumberman with plants at Ludington, Mich.; Judge H. W. Seaman, Chicago, and John I. Beggs, head of the Milwaukee Electric Railway & Light Co., Milwaukee. A formal announcement of the names of the officers and directors, as well as details concerning the plans for the company will probably be given out within the next fortnight.

Fords Will Help Lincoln Motor Car Co.

DETROIT, Jan. 31.—Henry Ford and Edsel Ford both have stated personally that the Ford interests will come to the rescue of the Lelands and the Lincoln Motor Car Co., Detroit, which is now in the hands of a receiver. The Fords intimated that they would bid at least \$8,000,000 at the receiver's sale next month, and rumor has it that they will bid the price up to \$11,000,000, if necessary.

Both the Fords stated that if the Lincoln organization was purchased, the Lelands would be retained in their present capacities and that no changes would be made except to have the purchasing done under Ford management and to institute Ford manufacturing methods. The Lincoln cars would be sold by present distributors, except where Ford dealers were equipped to do so and could do so to advantage.

United States Exposition Building in Brazil

The contract for the construction of the exposition building to house the exhibits of the United States at the great Brazilian Exposition next September has been awarded to Dwight P. Robinson & Co., New York, which already has large construction work under way for the Brazilian Government in Northeastern Brazil. Representatives of the company and of Frank L. Packard, architect, of Columbus, Ohio, who will design the building, sailed recently for Brazil to begin the work at once. The exposition will open at Rio de Janeiro on Sept. 7 and will commemorate 100 years of Brazilian independence.

It was recently announced at the White House that the American building would be of permanent construction and so designed as to permit of its being converted into an embassy for this country's diplomatic representative after the close of the exposition.

New Blast Furnace Replaces Pioneer

Modern Equipment Provided for Warwick Furnace Plant—Pre-Revolution Activities of First Warwick Stack

CONSTRUCTION of the original Warwick furnace was started in 1737, and the plant was first operated in 1738. It was located on the south branch of French Creek in Chester County, Pa., about 10 miles southwest of Pottstown, where the remains of the furnace are still to be seen. This early plant, probably the largest operating in the Colonies, made many castings for the early husbandry. It is credited with having cast the first of the stoves invented by Benjamin Franklin.

In the Revolutionary period the furnace was actively engaged in casting cannon for the Continental army, and during the activities of Howe's troops in the vicinity of Philadelphia some of the Warwick cannon were buried. For safety, on the furnace property. In the early fall of 1777, before Washington met the British at Brandywine, the American army was encamped for a time at Warwick. The subsequent operations of the furnace are woven into the early history of iron making in Pennsylvania, and the narratives of American manufacture of sixty years ago give prominence to the enterprise at Warwick. It was not until 1867 that this furnace made its last blast, its stoppage being accelerated by increasing difficulties of obtaining charcoal, and also to a great degree by its inaccessible location.

Following a successful campaign of over a century and a quarter, it seemed natural, when a new iron enterprise was formed in the vicinity, that the projectors should perpetuate the name of Warwick. Accordingly, a charter was granted March 30, 1872, to the Warwick Iron Co., headed by Jacob H. Gabel as president. Construction of the new furnace was begun in 1875, and the first blast put on in 1876. The stack, built of brick, banded with iron hoops, rested on masonry columns; its dimensions were 55 ft. in height with a bosh diameter of 16 ft. The furnace was blown with six tuyeres, the blast being supplied by a single 96 x 40 in. by 7-ft. stroke non-condensing engine, while the air was heated in two iron pipe stoves. The ores used were mainly local, and the fuel principally anthracite coal.

In 1877, Edgar S. Cook, who had displayed remarkable ability as a young man in blast furnace prac-

tice, took charge at Warwick, and installed a chemical laboratory at the furnace—one of the first steps in this direction in the East. With the aid of technical advice from the late John Birkinbine, Mr. Cook made changes in the lines of the furnace which, with other improvements, raised the production of iron from 185

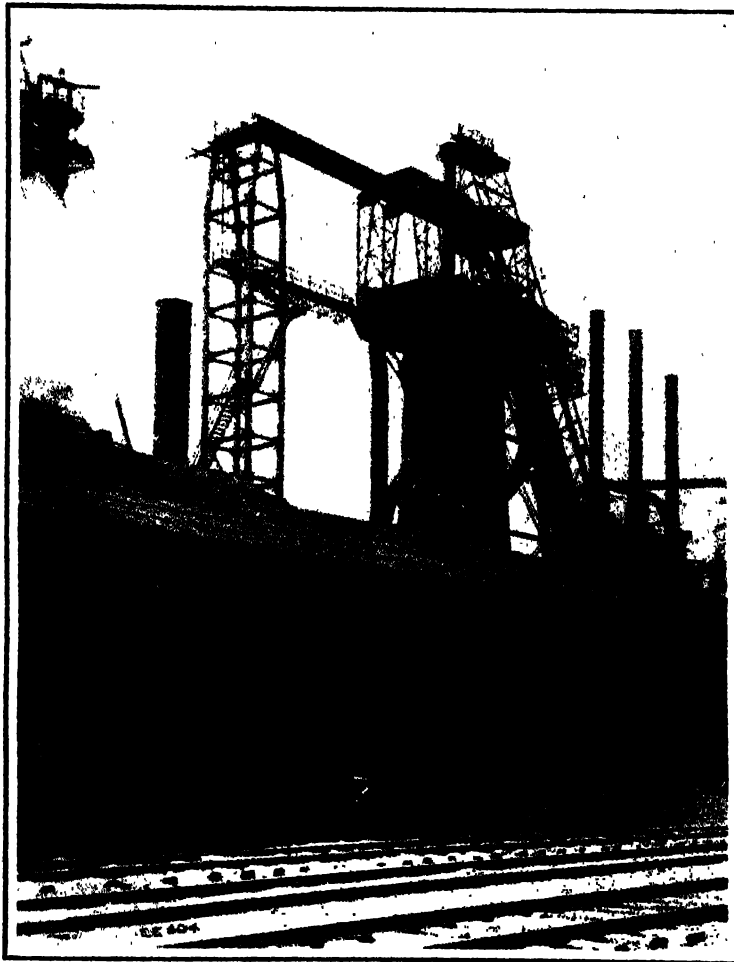
to 350 tons per week. From December, 1880, the furnace started on a campaign which lasted five years, the output averaging over 100 tons per day, and the plant proceeded upon a successful career.

In 1892, after a careful investigation of fire brick stoves then in use, Mr. Cook installed a set of three Hugh Kennedy type, each 20 by 60 ft., replacing the iron stoves of the Durham pattern. This radical change brought forth both friendly criticism and skepticism from the leading anthracite iron masters, who at that time were staunch adherents of the iron type stove. The new stoves were designed by Hugh Kennedy, then manager of the Isabella plant near Pittsburgh, and from outward appearances resembled the ordinary dome top type of the present, except

that they were surmounted by a pair of squatty chimneys, which gave them an unusual look.

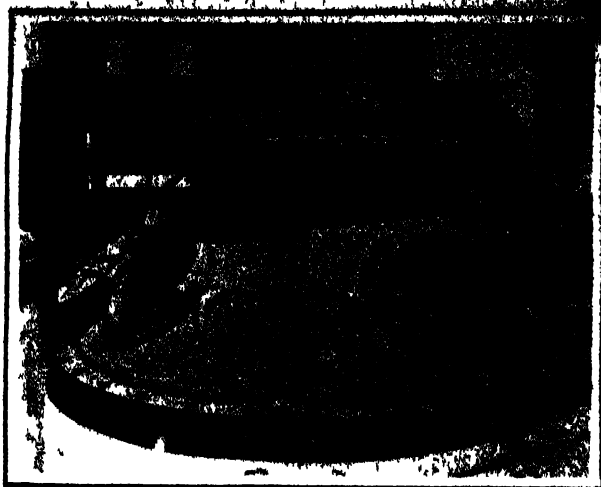
Revival of the iron business, following the long stagnation from the panic of '93, brought much expansion in the industry, and the Warwick Iron Co. was reorganized into the Warwick Iron & Steel Co. in 1899. At this time a new furnace was projected, and construction was commenced in 1900. The program included an entire new plant to supplement the existing unit, with the addition of a pig casting machine of the Uehling type. The furnace was 100 by 22 ft., with four stoves of the same height, and the stack was the first of that size to be built in the East. The lines of the new furnace were obtained by proportionate enlargement of those of the older stack, which had done such good work. But it was found in actual practice that these lines did not give the desired results, and several changes had to be made before the furnace gave satisfactory grades and output.

While the original stack had been improved by the replacement of the Hugh Kennedy stoves by stoves of larger dimensions and of a center combustion type, the



Skip Bridge Has Independent Shear Leg Support Stair tower at left supports end of trolley beam 68 ft. from center of furnace

Company felt justified in erecting a third furnace to be used as an alternate, in the event that either of the two stacks were out of blast. Accordingly, furnace "A" was constructed, of the thin-lined type, located between the two built previously, and arranged to be used with the stove and power equipment of either No. 1 or No. 2 furnaces. This unit had the general characteristics of the type much exploited some 10 years ago, and was constructed with the top structure in-

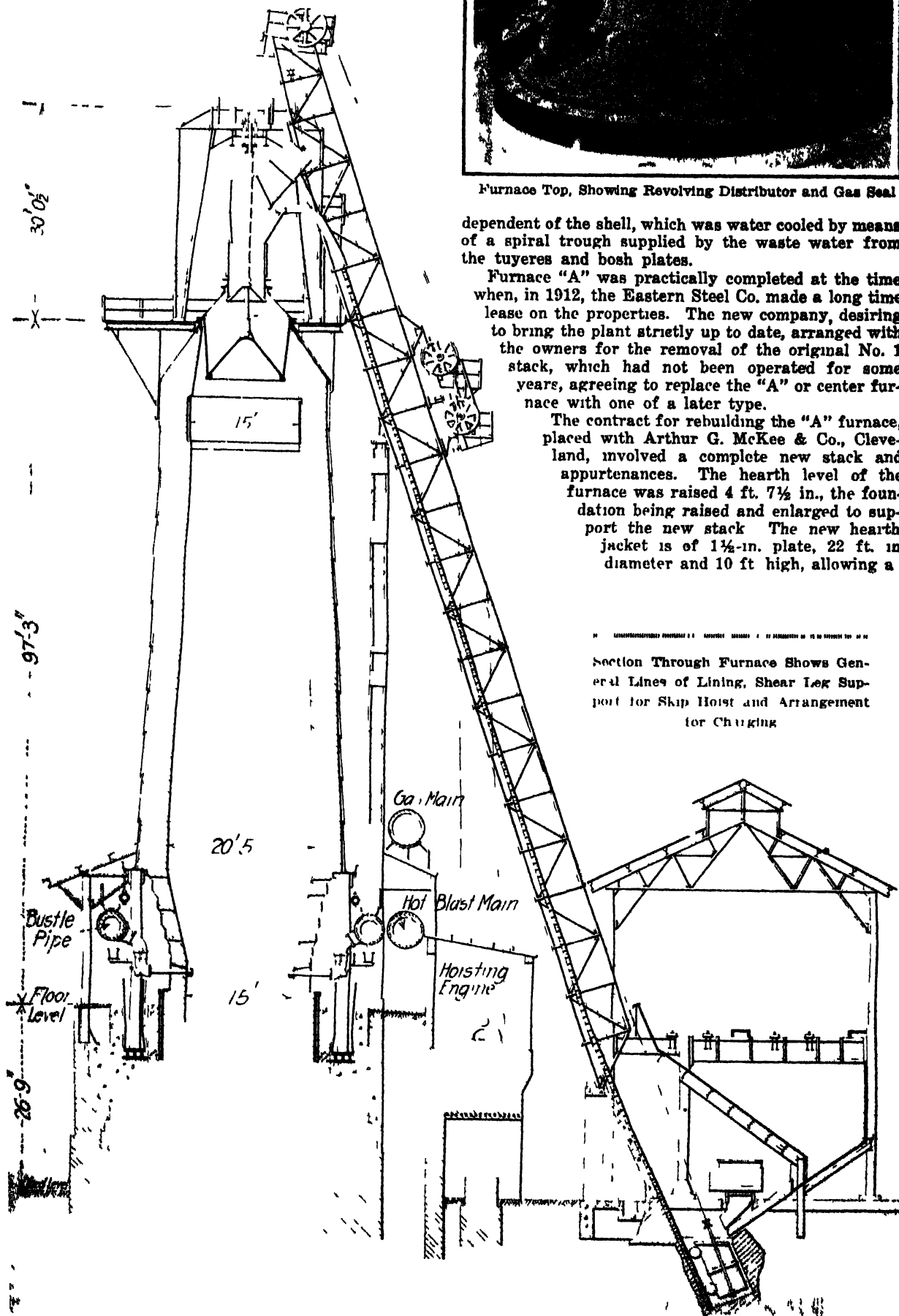


Furnace Top, Showing Revolving Distributor and Gas Seal

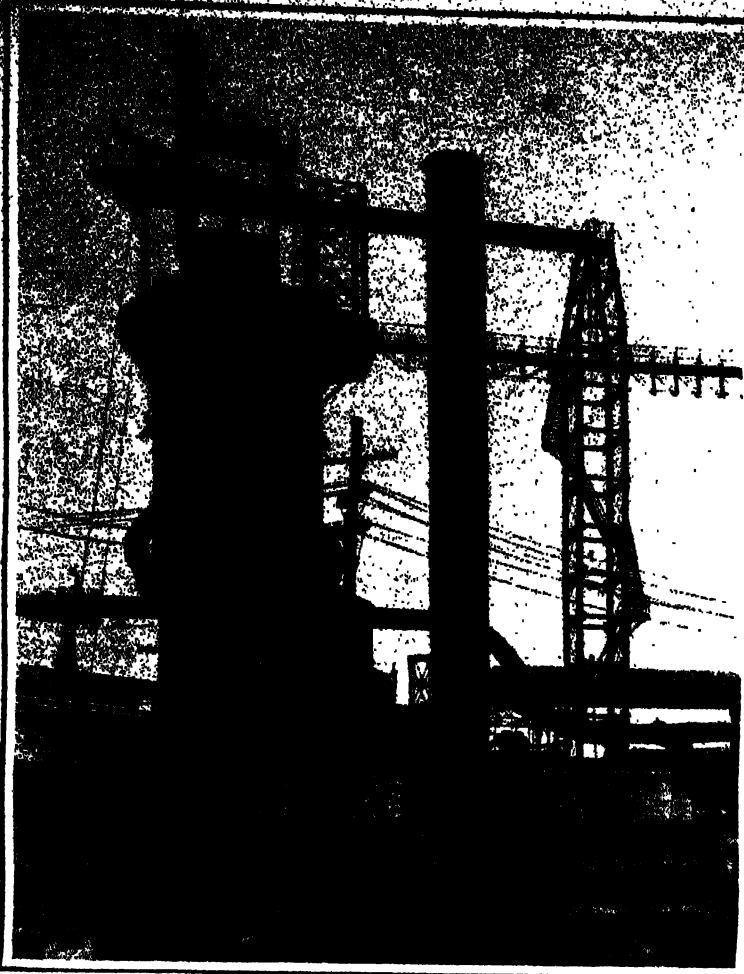
dependent of the shell, which was water cooled by means of a spiral trough supplied by the waste water from the tuyeres and bosh plates.

Furnace "A" was practically completed at the time when, in 1912, the Eastern Steel Co. made a long time lease on the properties. The new company, desiring to bring the plant strictly up to date, arranged with the owners for the removal of the original No. 1 stack, which had not been operated for some years, agreeing to replace the "A" or center furnace with one of a later type.

The contract for rebuilding the "A" furnace, placed with Arthur G. McKee & Co., Cleveland, involved a complete new stack and appurtenances. The hearth level of the furnace was raised 4 ft. 7½ in., the foundation being raised and enlarged to support the new stack. The new hearth jacket is of 1½-in. plate, 22 ft. in diameter and 10 ft. high, allowing a



Section Through Furnace Shows General Lines of Lining, Shear Leg Support for Skip Hoist and Arrangement for Charging



General View of Furnace, Showing Trolley Girder and Trolley at Right

hearth diameter of 15 ft., as compared with 14 ft. in the old furnace. The drawing shows the sectional elevation of the furnace, furnace top, skip bridge and stock bins. The tuyere jacket is 19 ft. 6 in. inside diameter, 4 ft. 7 in. high, of 1-in. plate. The furnace shell is of $\frac{3}{4}$ -in. plate, the mantle ring being of 1-in. plate and heavy angles.

There are eight columns, spaced alternately at 50 deg. and 40 deg. angles. This allows the uniform spacing of the twelve tuyeres, two tuyere stacks being placed in each 50 deg. and one each in 40 deg. space. The columns are of structural shapes, these being considered more reliable and less bulky than cast iron columns.

Hearth and bosh cooling system consists of eight rows of copper cooling plates. The experience of the engineers has brought out the inadvisability of cooling plates above the mantle, and the construction of recent furnaces with few exceptions bears this out. The hearth brick are also cooled by cast iron cooling plates inside the hearth jacket. The new lining consists of approximately 497,000 fire brick, 9 in. equivalents.

The furnace top was entirely rebuilt. A new platform of 5/16 in. plate with solid hand railing is supported by the cast steel furnace top ring and structural brackets. The top structure combines all facilities of a modern furnace top, with a compactness and co-relation of parts not often realized. Three structural "A" frames supporting the trolley beams are mounted on the platform, two of these forming a tower.

A novel scheme was developed to utilize the old vertical hoist tower of the furnace. This was rebuilt and equipped with stairway and platform, and so placed as to support the ends of the trolley beams, thus allowing them to extend to the unusual distance of 68 ft. from the furnace center line. The trolley has a capacity of 25 tons, sufficient to handle the load of the large bell and hopper taken together.

The large and small bell beams, as shown in the drawing, are supported by the trolley beams, and

are pivoted on a single large steel pin with special adjustable bearings. The large beam only is counterweighted, the additional counterweights required being provided at the bell cylinders, which are placed at the cast house level. The beams are connected with the bell cylinders by steel cables for closing the bells, the adjustment of counterweights being such that the bells open by gravity.

The skip bridge was raised to conform with the new furnace height, and the angle steepened from 67 deg. to 71 deg. 47 min. from the horizontal. The bridge is supported by a shear leg independent of the furnace stack, and has a plate deck under the rails. At the top of the bridge is an auxiliary trolley beam for handling the bell beams. As the hoist house is under the skip bridge, the skip ropes are brought through the bridge by guide sheaves, as shown in the drawing.

The new large bell is of cast steel, 11 ft. 3 in. in diameter, with 50 deg. slope. The large bell rod is forged steel, 5 in. in diameter. The stock distribution is accomplished by a McKee revolving distributor, equipped for automatic recurrence of a six skip, six position cycle.

Four new downcomers were provided, connecting to the old pipes. The downcomer connections at the top of the furnace are of the McKee patented type, made up of cast steel. They serve as a preliminary dustcatcher, in that the gas must turn at a sharp angle to pass the baffle and enter the vertical outlet, thus causing the particles of stock carried with the gas to strike the end of the inclined pipe, or the baffle casting, and



Furnace Top from Stair Tower, with Revolving Distributor and Downcomer Castings in Lower Part of View

and back into the furnace. The arrangement of down-caster castings is shown on page 1539, THE IRON AGE, June 9, 1921. One bleeder 36 in. in diameter by 41 ft. high was installed.

Three 75-ton hot metal ladle cars were purchased and put in operation. These are of the mixer type and are motor operated.

SHIPBUILDING DECLINES

Falling Off in 1921 of Over 1,500,000 Gross Tons as Compared with 1920

The shipyards of the world during 1921 launched over a million and a half gross tons less of vessels than in 1920, says a statement just issued by Lloyd's Register of Shipping.

In the United States alone, it is pointed out, the decrease was 1,470,000 tons. British yards also showed a decline from the 1920 figure, but this drop of over half a million tons was largely offset by a gain for other countries of 467,000 tons.

The comparison between the launchings for the two years is shown by the following table, prepared by Lloyd's Register, giving the gross tons:

	1921	1920
United States	1,006,413	2,476,253
United Kingdom	1,538,052	2,055,624
Other countries	1,797,211	1,329,789
World	4,341,679	5,861,666

While the 1920 total of launchings by American shipyards was greater than for that of either the British yards or those of other countries, it is stated, the lead of 420,000 tons over Great Britain for 1920 was transformed to a British lead of 531,000 tons last year, while the gap of 1,146,000 tons, representing the American lead over other countries in 1920 was converted into a lead of 790,000 tons for those nations last year.

For the first time since the war, Lloyd's Register gives figures of production by German shipyards, and these explain why the aggregate for other countries than the United States and the United Kingdom increased in comparison with 1920, while the American and British totals declined.

Launchings by German shipyards during 1921 are given as 509,064 gross tons, or 42,000 tons more than the gain for all other countries than America and Britain, so that the minor nations, excluding Germany, showed an actual loss on the year's output.

The most significant feature of the German returns, however, is that they show that the shipyards of Germany have now more than regained their pre-war production. Launchings for that country during 1913 aggregated 465,000 gross tons, and as that was the record year for launchings of merchant ships in Germany, last year's total sets a new figure.

While the production during 1921 for the world was 2,803,000 gross tons less than in the record year of 1919, it was more than a million tons in excess of the 1913 world total. The output for the pre-war year and for the record year of production are shown in the following table:

	1919	1913
United States	4,075,355	276,000
United Kingdom	1,620,412	1,932,000
Other countries	1,418,722	1,124,000
World	7,114,549	3,332,000

It will be noted that while British shipyards last year launched less in actual tonnage and in the proportion of the world's total than before the war, the other countries showed gains in both respects. While the United Kingdom built considerably more than a half of the world total in 1913, the 1921 output was only slightly more than a third of the aggregate. The following shows the proportion of the annual world output by the different shipbuilding nations before and since the war (by percentages):

	1913	1919	1920	1921
United States	5.3	57.1	42.2	23.2
United Kingdom	58.9	22.6	35.1	36.4
Other countries	35.7	20.3	22.7	41.4

Within the past year, it is shown, the American

percentage of the world's total was cut almost in half. Britain's percentage gained slightly and that of the other countries almost doubled.

In some respects, the launchings for 1921 show gains over those for the previous year. Tanker construction for instance increased almost 65 per cent over the 1920 figure. Two-thirds of this class of building was done in the United States, but gains were made by Great Britain and the other countries, as the following figures, giving the launchings in gross tons of vessels of 1000 tons and over for the two years, show:

	1921	1920
United States	690,308	567,000
United Kingdom	250,868	65,400
Other countries	109,180	8,000
World	1,050,356	640,400

Increases are also shown in the number of large vessels being constructed. In comparison with 32 ships of 10,000 gross tonnage and over reported launched in 1920, there were 47 last year.

Motorship construction continues to gain. Vessels to be fitted with internal combustion engines, which were launched last year, total 306,642 gross tons, as against 189,977 tons in 1920. A decline is indicated, however, in the construction of ships fitted with turbines, the aggregate of this class of ships for 1921 being 1,195,000 tons compared with 1,825,000 tons the previous year.

About 40 per cent of the total construction in British shipyards last year was for foreign account, 591,870 gross tons being launched for buyers abroad.

Following Great Britain and the United States in the amount of tonnage launched last year comes Germany, Holland, Japan, France, Italy, and the British Dominions are next, in the order named. Japan and the British Dominions show declines from the 1920 total, but gains were made by the others. The production of these countries, for the two years, was as follows:

	1921	1920
Holland	332,402	183,149
Japan	327,425	456,642
France	210,663	93,449
Italy	164,748	133,190
British Dominions	129,675	203,644

The total of shipbuilding orders in hand at the beginning of this year, throughout the world, according to the returns of Lloyd's Register, represented 4,457,000 gross tons. As a great part of this has already been launched, however, and little in the way of new work is being placed, the 1922 total of launchings will probably be well below the 1921 figure of 4,341,000 tons.

Coal and Coke Production

UNIONTOWN, PA., Jan. 30.—Very little change is being shown in coal and coke production in the Conneautville bituminous district. While there is a continued contract inquiry, few contracts are reported and the upward turn is not being manifested so soon as many conservative observers had anticipated.

Coke production in the region, tabulated for the week ending last Saturday, was 86,550 tons.

Officials of the Frick Coke Co. entertained 40 plant officials of their Ronco plant at the Country Club here in recognition of the new regional plant production record set at Ronco in December. W. H. Clingerman, president of the company, and Clay Lynch, general superintendent, were the speakers of the evening.

Government Will Sell Steel

WASHINGTON, Jan. 31.—The Emergency Fleet Corporation will receive bids up to Feb. 8 on a tonnage of plates, shapes and bars at the Duval Corporation Shipyard, South Jacksonville, Fla., most of which is said to be in good condition. It includes 6136 tons of unpunched plates ranging from 3/16 in. to 1-in. in thickness; 635 tons of Scotch boiler plates, 117 tons of diamond floor plates, 2790 tons of fabricated material, of which 80 per cent are built-up members; 788 tons of plain angles and 211 tons of miscellaneous material, principally steel bars of different shapes and ranging from 1 in. to 3 in. in diameter.

Sulphur Obtained from Blast Furnace Slag

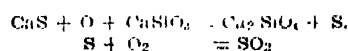
The Diehl Process and Apparatus Developed in Germany—
Yields from Slags from Steel-Making.
Foundry and Bessemer Irons

THE obtaining of sulphur from blast furnace slag is discussed by Prof. L. H. Diehl of Oberhausen, Germany, in an instructive article in a recent issue of *Stahl und Eisen*. Several paragraphs are devoted to the importance of sulphur in modern industrial life, and to the fact that before the war about 1,000,000 tons of pyrites, 250,000 tons blende and 30,000 tons sulphur were imported into Germany each year. During the war every effort was made to increase the output of German deposits of pyrites and zinc blende, and efforts were made to obtain sulphur from the large beds of gypsum and anhydrite (natural anhydrous calcium sulphate). Unfortunately efforts in these directions have not been entirely successful and there is today a scarcity of sulphur in Germany.

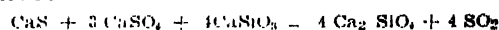
It was therefore desirable to investigate every available source of sulphur, which led the author to work on blast furnace slag. Even if its sulphur content is small the total amount is very large. The slag production in Germany before the war was approximately 20,000,000 tons, with sulphur running from 1 to 2.25 per cent and averaging 1.50 per cent. This represents

at least 300,000 tons of sulphur thrown away each year. Because of this large available supply, efforts were made to develop it and the method worked out protected by a war patent.

The Diehl process consists in obtaining sulphuric acid by oxidation of the calcium sulphide in blast furnace slag by means of air or by sulphates such as gypsum or anhydrite, with the help of air. The chemical reactions are very simple. The calcium sulphide unites with oxygen and gives lime which changes to ortho-silicate, and at the same time free sulphur is liberated. With sufficient excess of air this is burned and, if not, it passes off unburned with the gases.

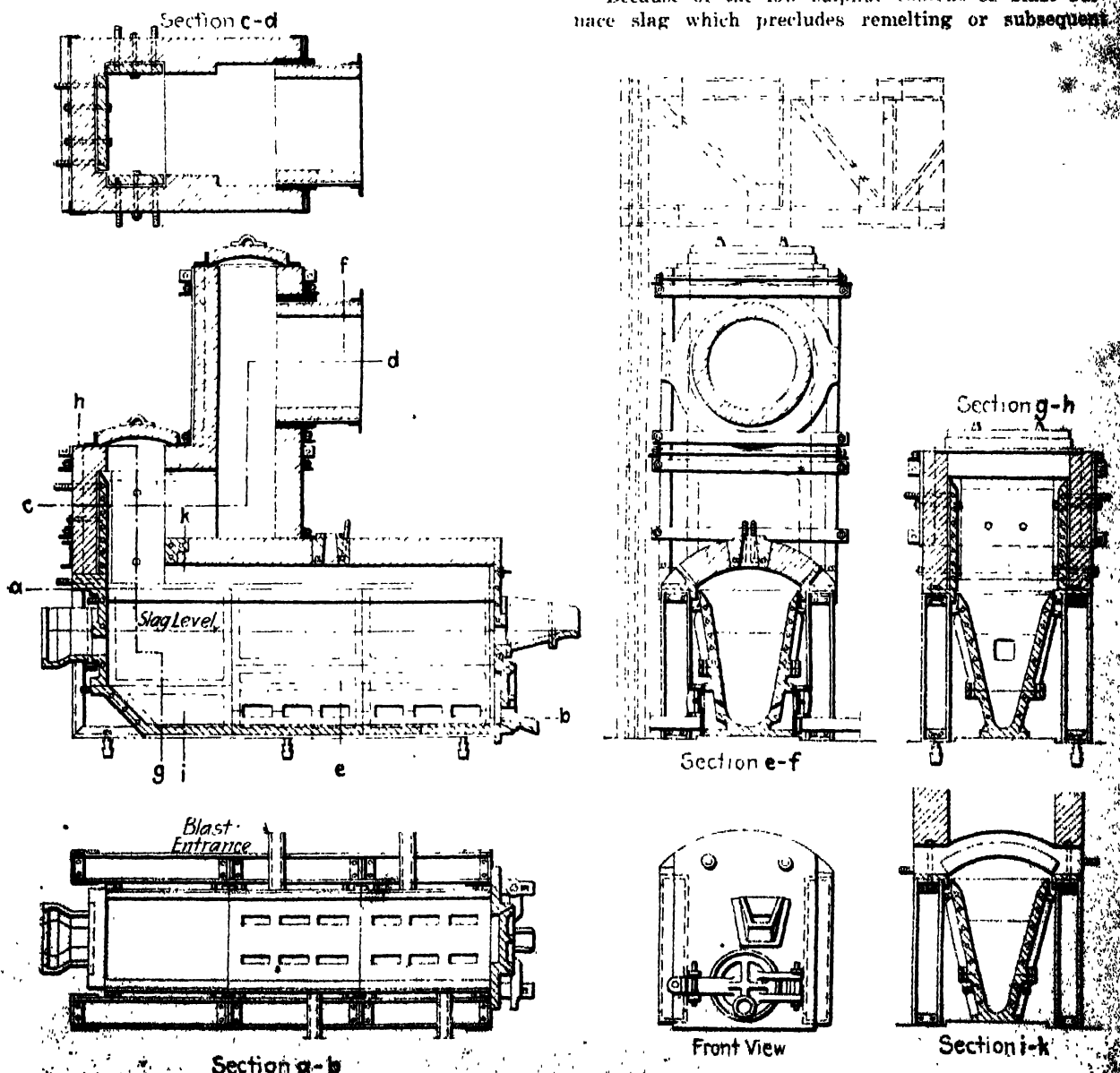


The reaction when calcium sulphate is present is as follows:



It should be mentioned that calcium sulphide and sulphate cannot exist together in a molten silicate slag, as is the case in the solid condition.

Because of the low sulphur content of blast furnace slag which precludes remelting or subsequent



Throughout, all the work was done on the molten slag as it came from the furnace by blowing air through it. Preliminary tests carried out with molten slag and oxygen gave a gas containing 23.1 per cent SO_2 by volume. Further experiments showed that a slot-shaped tuyere gave a richer gas than a round one. Following these tests an apparatus was designed that has been used successfully for several months at Gutehoffnungshütte. Its construction is shown in the illustration, which gives sectional and front views. The body consists of a gray iron casting with pipes for water cooling in the casting. In the bottom at each side are openings in which tuyeres can be placed. According to the kind of cast iron plates placed in these openings two, three or four slots can be used, one over the other. Blast boxes are arranged along the sides. When the apparatus is warm and the slag hot and fluid, the pressure runs from about 2 to $3\frac{1}{2}$ lb per sq in and often it rises to about $4\frac{1}{2}$ lb if the slag is colder, due to the formation of a spongy solid slag above the tuyere.

At the end of a run of slag, the tapping hole is opened and the slag drained off. Then the working door is opened and the crusts and scales around the tuyeres broken and removed. The slag coating on the apparatus itself is allowed to remain unless it breaks off automatically, as it protects the metal against sudden changes of temperature, and also serves as an insulator for the slag, preventing unnecessary cooling.

In regard to the action of the different slags the following may be said. The sulphur output is higher as the slag is hotter and higher in sulphur. Acid slags give off sulphur more easily and more thoroughly than strongly basic slags. However, the latter are usually hotter and higher in sulphur, so that good results are obtained.

The change in appearance of the slags after treatment is interesting. It is known that slags with large amounts of calcium sulphide are milky because of numerous needles of sulphide. Such slags after treatment become completely clear and glassy, a proof that the sulphide is decomposed and the lime dissolved in the body of the slag. In some cases, with high sulphur slags and insufficient air, free sulphur is produced. This cannot be used as a method for obtaining free sulphur, but it explains the tremendous flame seen when air is blown through hot liquid slag rich in sulphur, the sulphur vapor burning in a long flame. This flame is intensively white with a violet tinge, due to lime vapor being present as a white mist.

If the gases produced in the process are conducted through iron pipes, an incrustation of white salts is produced, consisting almost entirely of potassium bisulphate. The temperature of the gases is about 930 to 950 deg. C, measured away from the range of radiation from the fluid slag.

The apparatus shown, measuring 3.5 meters (11 ft 5 3/4 in) long 0.6 meter (1 ft 11 1/2 in) wide and 1.1 meters (4 ft 7 in) high was sufficient to treat all the slag from a large blast furnace making 150 to 200 tons of pig iron each 24 hr. It is compact, and stands up well in practice. Average results obtained over several months on slag when making iron for open hearth furnaces are given in Table I.

TABLE I		
Air Treated Blast Furnace Slag from Steel Making Iron		
Original Slag Sulphur Per Cent	Treated Slag Sulphur Per Cent	Sulphur Removal Per Cent
2.26	0.97	1.38
2.21	1.11	1.06
2.85	1.11	1.01
2.44	1.26	1.15
2.44	1.19	1.25
2.45	1.20	1.25
2.40	1.15	1.25

These slags throughout were hot and fluid. A test on slag while making low phosphorus gray iron showed 2.26 per cent S. in the slag entering and 1.03 per cent

S. in the slag leaving the apparatus. The gas was 10.37 per cent SO_2 , 1.3 per cent CO , 2.3 per cent O_2 , and 84.63 per cent N_2 , all by volume.

Table II gives the results on basic Bessemer slags both with and without the addition of anhydrite, CaSO_4 . These tests ran for over a month. The oxygen content of the gases was in all cases sufficient for the change of the SO_2 to SO , whether the chamber or contact process was employed. The percentage varied from 9.5 to 10.5 per cent by volume.

TABLE II
Composition of the Obtained Gases, showing Percentage of SO_2

Without Addition of CaSO_4	With Addition of CaSO_4	Without Addition of CaSO_4	With Addition of CaSO_4
5.70	7.27	3.60	8.48
4.93	6.34	3.19	10.34
5.11	5.63	5.77	7.76
4.50	7.57	6.11	7.66
5.63	10.86	6.51	6.37
8.09	9.95	7.10	7.17
7.58	6.41	8.39	6.37
5.03	8.19	8.96	6.86
6.20	7.78	9.57	6.97
5.92	8.88	5.57	14.11

The gases obtained by the Diehl process contain on the average 6 to 7 per cent SO_2 , small amounts of CO , from 1 to 12 per cent, and about 10 per cent oxygen, while the rest is nitrogen. There is entire freedom from arsenic, chlorine, fluorine, carbon monoxide, sulphur and dust or similar impurities, except for small amounts of potassium bisulphate which can be easily removed. The gas is therefore remarkably suitable for the production of specially pure sulphur products such as liquid sulphur dioxide, sulphites such as sodium sulphite or sodium bisulphite, sulphuric acid or fuming sulphuric acid. A very rich gas can be obtained if a sulphate such as calcium sulphate is added to the slag while air is blown in. In this way the heat of the slag is used for decomposition. After treatment the slag can be used exactly as before and for granulating, slag wool, building purposes, etc., it is better because of the lower sulphur content.—G. B. W.

Report on Waterways Improvements

WASHINGTON, Jan. 30.—Of particular importance to iron and steel shippers is the report of the joint commission which studied the proposed improvement of the St. Louis River as an outlet of the Middle Western States and the Atlantic Coast. In a statement issued yesterday Congressman Nelson of Wisconsin stated that the analysis of testimony showed sentiment in Canada and this country favoring the proposed improvements. He insisted that the inquiry showed the need of opening this waterway to the resources of the Middle West, which is particularly rich in raw materials of the basic industries, such as iron ore, coal and copper. The commission reported that "no consideration of the economic practicability of the proposed St. Lawrence waterway can afford to ignore the important group of problems involving the relationship between rail and water transportation. In this group are included such questions as car and locomotive shortage, the terminal congestion, terminal and trans-shipment charges, rail rates and water rates, marine insurance and refrigeration." The expenditures recommended amount to \$252,000,000.

The commission believes that while it is physically practicable to bring both railroads and terminals up to the point where they could handle the traffic of the United States without serious congestion, the expense involved would be enormous, amounting in the opinion of experienced railroad executives, to two billion dollars per annum over a series of years, and it is perhaps questionable if in the end the relief afforded would be comparable to that promised by the creation of an all-water route from the interior of the continent to the Atlantic seaboard.

The commission is of the opinion that it would be desirable to make further study of the alternative plans before taking any definite action.

Silico-Thermy and Its Practical Application

German Iron-Silicon Castings of "Thermisilid" Made by Thermal Reactions—The Silicides Which Are Formed—Properties of the New Alloy

BY C. A. HEISE

AT a meeting held by the German Metallurgical Society, several months ago, Richard Walter, Düsseldorf, read a paper on a novel process of producing silicon alloys of a pre-determinable chemical constitution developed by the author. A synopsis of the paper follows:

Positive heat changes, due to reactions, are a feature of the smelting of iron and silicon which has not been subjected to detailed scientific research thus far, though they have been observed by other scientists devoted to the study of this particular field. The only possible explanation of these heat changes must be sought in the formation of silicides. If soft iron and silicon are simultaneously heated in a crucible, a spontaneous heat reaction will set in at about 1200 deg.

by the enormous heat as, for instance, cement or calcium carbide. Such is the heat generated by the formation of ferrosilicides that 80 per cent of the iron of the Fe_2Si silicide and 67 per cent of that of the FeSi silicide are not only liquefied but even considerably superheated.

When it is considered that the liquefaction is solely due to the liberated heat of the reaction, it is obvious that the melting process, aside from its interesting thermo chemical features, has also economic bearings which are worth studying. A certain analogy with aluminothermy—which, if silicon is used as a reducing agent, may be classed under silico-thermy—is apparent, a common feature of both being chemical transformation and positive heat changes with the differ-



Fig. 1 (Left) Is a Photomicrograph of a Silicon-Iron Alloy Formerly Produced in a German Foundry, While the Small Photomicrograph, Fig. 2, Represents the Structure of Tantalum. The third photomicrograph, Fig. 3, is one of Iron, and Fig. 4 (right) is a reproduction of the structure of the new iron-silicon alloy, Thermisilid

Celsius or considerably below the melting points of the two components, which will liquefy the charge within a few seconds, leaving behind a highly superheated metal.

The Silicides Formed

The silicides thus formed are either FeSi or Fe_2Si or their more or less saturated solutions in iron, according to the stoichiometric proportion of the quantities of the two components. The silicide, Fe_2Si , for instance, is obtained by proportioning the solid charge in a ratio of 80 per cent iron and 20 per cent silicon. The temperature of the bath immediately upon termination of the reaction was ascertained by test observations to be 1800 deg. Celsius and above. Both micrographic and chemical analyses confirm the fact that the molten metal crystallizes as a homogeneous body. An exact chemical transformation is thus taking place and it is interesting to note that the components react in a solid state already several hundred degrees below their melting points under simultaneous liquefaction. Owing to the swiftness of the reaction, a precise measuring of the temperatures is difficult and largely restricted to the measuring of the temperature at the termination of the reaction by an optical pyrometer when, however, a notable drop in temperature has doubtless already taken place.

An empirical method of obtaining some temperature data consists in adding such bodies to the charge which, while not participating in the reaction, are yet liquefied

ence, however, that a reduction is taking place in the aluminothermic process.

Silicides of Other Metals

Similar heat changes have been observed in the formation of silicides of other metals of the iron groups, such as manganese, nickel and cobalt, as well as with the metals of the chromium groups, chromium, tungsten and molybdenum.

The carbon content of the silicides plays a decisive rôle in the silico-thermic reaction, the exothermic process being hindered by carbon and, with certain percentages of carbon, no heat changes being noticed at all. The most violent reaction is observed with non-carboniferous iron, especially electrolytic iron, but the intensity of reaction decreases with an increasing carbon content. With cast iron no visible heat changes were noticeable at all, the silicon being mechanically separated from the iron under a simultaneous elimination of elementary carbon. Another result of the high temperature incident to silico-thermic reaction is the formation of a further carbon combination, silicon carbide (SiC).

Silicon Alloys in Industry

Silicon alloys are of importance to the chemical and associated industries on account of their resistance to acids and other aggressive matter. One of the oldest representatives of the silicon alloys is the

so-called neutral iron, (7 to 8 per cent Si). Some 15 years ago, British foundrymen began to increase the silicon percentage up to about 15 to 17 per cent, the new alloy being marketed under the name of Tantiron.

Fig. 1 is a photomicrograph of the structure of an alloy formerly produced at a German foundry. The honeycombed surface, the result of a separation of graphite when cooling down, illustrates better than any text the unserviceableness of the alloy for products required in the chemical industry. The instability of the structure of the Tantiron, shown in Fig. 2, is clearly revealed. The darker parts represent a carboniferous iron-silicon solution with an average Si content of 15 to 17 per cent, the lighter spots sprinkled in between are iron silicide, FeSi , of 33 per cent Si. The simultaneous occurrence of the two bodies having different silicon contents is, of course, bound to cause instability. Fig. 3 shows the American metal Ironac, characterized by the dendritic constitution of crystals. This material is known for its extraordinary hardness but is hardly suitable for castings.

Unstableness Due to Different Silicides

It is mainly due to this unstable character that these alloys have on the whole met with little favor in the chemical industry. Castings made of such alloys will easily develop cracks, the casting stresses being partly due to the tendency of the structure to change over into a state of balance, but even more so to the difference in contraction of the various silicides. The primary aim of the author, therefore, was to avoid an agglomeration of bodies of different constitutions, in other words: To produce a metal composed of one uniform silicide only. Such an alloy would consist of a chemically uniform body and therefore be in a state of balance.

Now, the ordinary melting methods heretofore followed were mainly in the nature of physical processes, though occasionally accompanied by synthetic formations of silicides. The only reliable way of effecting a chemical combination, however, is by way of reaction or transformation. Such a transformation is taking place in silico-thermic reactions. The photomicrograph of an alloy produced by this process is shown in Fig. 4. The arrangement of the polygonal crystals distinctly reveals a lawful orientation, the bright spots being the silicide, FeSi , while the darker mass represents a carboniferous solution of silicon in iron. The photomicrograph furthermore characterizes the homogenous and equalized alloy which is free of interior stresses.

This metal lends itself to castings the production of which has met with insurmountable difficulties so far

and is claimed to answer requirements by the chemical industry in a far higher degree than all its predecessors. In order to obtain satisfactory results, several other factors have to be considered in the practical application of the process which are primarily calculated to control the behavior of the carbon. Further details in this respect were not disclosed by the author on the plea of safeguarding the interests of the German industry. The alloy produced in this novel process has been given the name "Thermisilid" by the inventor and is being produced by the Friedrich Krupp Aktien Gesellschaft and the Esslingen Engineering Works. A range of samples of thermisilid products is shown in Fig. 5.

An Inexpensive Process

The silico-thermic reaction, which has been shown to be a simple and cheap melting process, may also be advantageously applied in other fields of metallurgy, particularly where a certain silicon content is required in the product, as is the case with dynamo and motor sheets. Another possibility of applying the process is the production of solid reactionary bodies consisting of ferrosilicon and small iron scrap which are formed into briquettes with cement as a bond. These briquettes will liquefy immediately upon reaching the temperature of reaction and will be serviceable wherever silicon is to be added to the charge, as for instance in foundries.

In conclusion it may be mentioned that while the thermisilid is highly acid-proof, it does not enter into corrosion where a rust-proof material is required. Regrading the workability of thermisilid, machining operations are still confined to grinding on account of the hardness of the alloy. It is hoped to improve upon this drawback so as to render "chip producing" machining operations possible. The strength of thermisilid is below that of cast iron.

The Millville Iron Works, Inc., Millville, N. J., has begun operations in its new plant. It will manufacture tanks and stacks, structural iron work mainly for bridge purposes, also repair boilers and do oxy-acetylene cutting and welding. The company has completed its purchases of equipment. Samuel Campbell is president; Daniel Campbell, vice-president, and Lester Fleetwood, secretary-treasurer.

W. B. Storey, president the Atchison, Topeka & Santa Fe Railroad, has announced that an extension 58 miles long will be built in Kansas to tap a rich wheat growing district in Stanton and Grant counties. This is the largest new construction project to be undertaken by a railroad since the pre-war period.

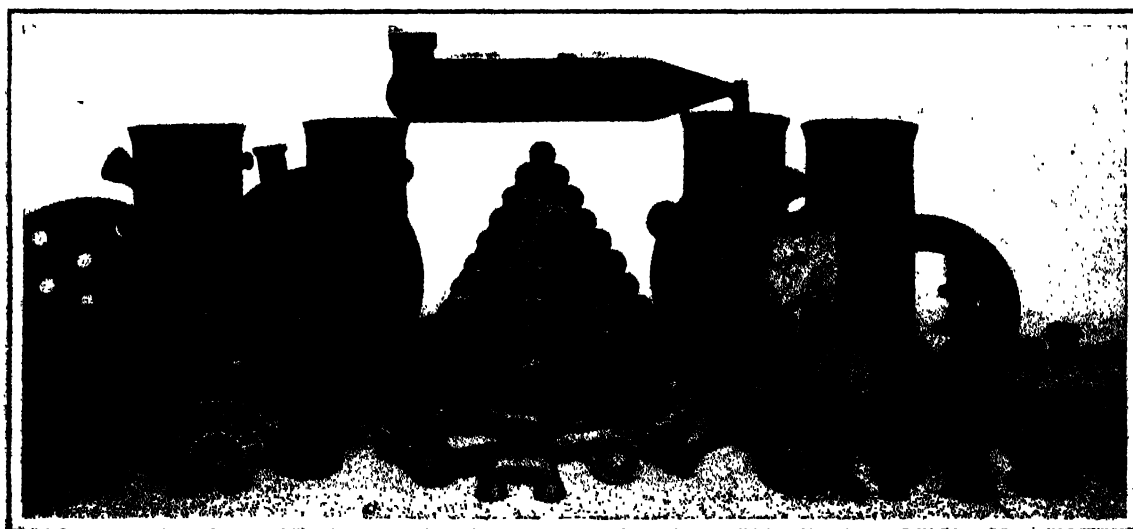


Fig. 5—Various Castings Which Have Been Made of the New German Iron-Silicon Alloy, "Thermisilid," Produced by the Heat of the Chemical Reaction.

February Meeting of the Mining Engineers

The 125th meeting of the American Institute of Mining and Metallurgical Engineers will be held at the Engineering Societies Building, New York, Feb. 20 to 23. The program for the two sessions on iron and steel on Wednesday, Feb. 22, follows:

10 a.m.—Room 1.

"Application in Rolling of Effects of Carbon, Phosphorus and Manganese on Mechanical Properties of Steel," by W. R. Webster.

"Acid Open-hearth Process for Manufacture of Gun Steels and Fine Steels," by W. P. Barba and Henry M. Howe.

"Effect of Sulphur and Oxides in Ordnance Steels," by W. J. Priestley.

"Electrolytic Deposition of Iron as Applied to Building Up Worn or Undersized Parts," by D. R. Kellogg.

2 p.m.—Room 2.

"Effect of Time in Reheating Quenched Medium-carbon Steel Below the Critical Range," by C. R. Hayward, D. M. MacNeil and R. L. Presbrey.

"Effect of Quality of Steel on Case-carburizing Results," by H. W. McQuaid and E. W. Ehn.

"Malleablizing White Cast Iron," by Arthur Phillips and E. S. Davenport.

The first of these sessions is in memory of Prof. J. W. Richards.

On Monday morning, Feb. 20, there will be a meeting of the committee on breakage and heat treatment of drill steel at which B. F. Tillson will preside. The regular smoker will be held in the evening.

Two sessions of the Institute of Metals Division are scheduled, one for Monday afternoon, Feb. 20, and one for Tuesday afternoon, Feb. 21. Symposiums on oil, gas, mining and on industrial relations fill the programs for other sessions.

The annual banquet will be held at the Hotel Pennsylvania on Wednesday evening, Feb. 22.

Several excursions are planned for Thursday, Feb. 23. The Crucible Steel Co. of America's plant at Harrison, N. J.; the Bayway plant of the Standard Oil Co. of New Jersey and the chrome plant of the U. S. Metals Refining Co. are to be selected from by those interested.

Drop Forge Association Activities

The recent organization of the American Drop Forging Institute, to serve the interests of drop forging makers in extending the field of use of such forgings, has apparently resulted in the suspension of the American Drop Forge Association. The latter association was made up of the heads of the drop forging departments of the various manufacturing plants like automobile plants, and also of the commercial and technical executives of the independent drop forging companies.

There is now a plan for the new association to carry on the practical matters formerly handled by the American Drop Forge Association. Four or five groups of the technical and shop men will be formed to meet at intervals to discuss shop practice and annually to review activities. It is the expectation that the institute, combining all the subjects of interest to the industry, will cover a wide field and be more useful and valuable than was the association. A uniform cost system is actively being studied under the supervision of the Cleveland office of Scovell, Wellington & Co., in the Hanna Building, that city.

Buffalo Engineering Society in New Quarters

The Engineering Society of Buffalo, with a membership of 600, now has permanent quarters in the Iroquois Hotel, Buffalo. These quarters are fitted up as a club and have, after two months, resulted in a marked increase in interest in the activities of the society.

At the January meeting of the Society, Jan. 10, there were two speakers. E. B. Neil, Pierce Arrow company, spoke on "Progress in Worm Gear Designing." Capt. George H. Norton, representing the city planning commission of Buffalo, outlined the activities of the commission.

On Jan. 24 the first of a series of luncheon meetings

was held. Arthur C. Pound, under the subject "Idle Mills and Minds," covered the psychological effect of automatic machinery on industrial workers.

The regular monthly meeting, Feb. 14, will be addressed by Ralph H. McKee, Ph.D., professor of chemical engineering, Columbia University, on the subject of "Gasoline from Oil Shale."

Steel Manufacturers Join Standards Committee

Beginning with 1922, the American Railway Association (Engineering Division) and the Association of American Steel Manufacturers became member-bodies of the American Engineering Standards Committee.

The Association of American Steel Manufacturers is an organization of forty iron and steel manufacturing companies. Its activities are limited to the standardization of rolling mill practices and to the standardization and inspection of iron and steel products. The association was organized in 1895. Its official representative on the American Engineering Standards Committee has not yet been designated.

The American Railway Association, which speaks for practically all the steam railroads of the country, has four technical branches, each having its own secretary, the engineering and the mechanical divisions, and the signal and the telephone and telegraph sections. The engineering division, which is intimately connected with the American Railway Engineering Association, the two organizations having the same officers, covers broadly the civil engineering activities of the railways.

These two new member-bodies bring the total number of national organizations represented upon the American Engineering Standards Committee up to 28, and of representatives to 52.

Estimates of the extent to which the 1919 coal strike in the bituminous field affected output, now made by the United States Geological Survey, are of interest in view of the approaching "show down" on miners' wages, scheduled for March 31. Of the total capacity, 71.6 per cent was involved in the 1919 strike.

COMING MEETINGS

February

American Boiler Manufacturers' Association. Feb. 13. One-day winter meeting. Fort Pitt Hotel, Pittsburgh. Secretary, H. N. Covell, 191 Dikeman Street, Brooklyn, N. Y.

American Institute of Mining and Metallurgical Engineers. Feb. 20-23. Spring meeting, Engineering Societies Building, New York. Secretary, Frederick P. Sharpless, 29 West Thirty-ninth Street, New York.

American Association of Engineers. Feb. 22. Congress Hotel, Chicago. Secretary, C. E. Drayer, 63 West Adams Street, Chicago.

March

American Society for Steel Treating. March 3. Sectional meeting, Engineering Societies Building, New York. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Refractories Manufacturers' Association. March 15, 16 and 17. Annual meeting, Chicago. Secretary, F. W. Bonahoe.

April

National Metal Trades Association. April 19 and 20. Annual meeting, Hotel Astor, New York. Secretary, Louis W. Fischer, Peoples Gas Building, Chicago.

American Supply and Machinery Manufacturers' Association and Southern Supply & Machinery Dealers' Association. Joint Meeting, April 24 to 26, Birmingham. F. D. Mitchell, 233 Broadway, New York, is secretary of the American association and A. M. Smith, Smith-Courtney Co., Richmond, Va., is secretary of the Southern association.

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dent, business manager, 327 S. La Salle Street, Chicago.

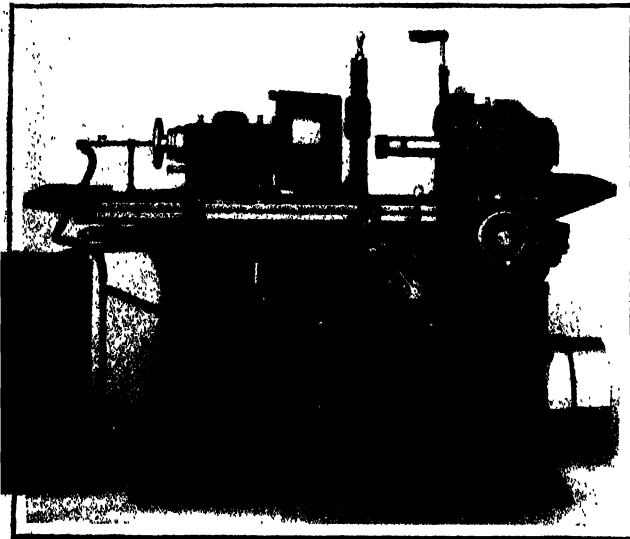
American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Colin G. Fink, 110 Park Avenue, New York.

Internal Grinder for Production Work

An internal grinding machine known as the Hydroll, designed primarily for production work and based upon the principle of high traverse speeds, has been placed on market by the Greenfield Tap & Die Corporation, Greenfield, Mass.

The superiority of the machine, it is claimed, is in its ability to remove stock rapidly in roughing operations, for holes of 3 in. bore diameter or greater. It is said to remove at least one cubic inch of hardened steel per minute, floor to floor, assuming a reasonably fast holding fixture. Where exceptional finish is desired, production rates are sacrificed to some extent, although the high operating speeds are said to show to advantage in this class of work as compared with conventional machines of the slower type.

The machine is shown in the accompanying illustration. The wheel spindle is carried on a wheel slide



The Design Is Based on the Principle of High Traverse Speeds. Flexibility of table control is a feature

controlled by a feed screw calibrated for feed increments of $1/4000$ in. on the bore diameter of the work. The work table reciprocates upon ways at right angles to the wheel-slide ways and carries a work head for holding and rotating the work piece.

The table traverse speed is controlled by the regulation of a sensitive throttle valve which admits oil under low pressure to a distributing valve, controlled by the table-limit stops, and thence into either end of a double-acting cylinder and piston mechanism attached to a crosshead on the under side of the table. It is claimed that by a careful application of hydraulic principles a flexibility of table control has been obtained which is practically impossible to get by mechanical means. Table speeds from 2 to 36 ft. per min. are employed in the usual range of operation, while maximum speeds of 50 ft. per min. are possible in the present design. Special designs can provide for faster operation.

There are no definite stations of speed setting and minute shading of speed is possible. Valve and piston design provides for shockless reversal. The time to accomplish a reversal is said to be so small that on $1/4$ -in. stroke the table will reverse 320 times per min. without shock. A pressure relief valve is provided to stop the table when overloaded, this feature also permitting accurate positioning of the table for grinding against a shoulder. A screw-adjusted stop locates the table, which is held in place under oil pressure. By a combined use of reversing and locating stops, the table can be held to within 0.0005 in. limit on reversal, without sacrifice in operating speed.

The work is revolved toward the operator at the top, while the wheel turns away from the operator at the top. The diamond contacts on the back of the wheel throw the dust down instead of up. Spindle bearing pressures are in the same direction whether the wheel is grinding or running free, a feature intended

to eliminate "hunting" in the bearings and prevent one source of bell-mouth grinding. Ball bearings are employed throughout and the standard spindles provided are mounted upon ball bearings installed so that the thrust adjustment eliminates shake in either axial or radial pressure action. A good commercial finish free from chatter is said to be obtainable with the standard spindles. Where exceptional mirror finish is desired special types of spindles are used.

For large bearing races having straight holes a special type of work head is provided which chucks several races end to end, holding them endwise between a plunger operated by oil pressure and an iris plate mechanism fashioned after a camera shutter. The plunger ejects the load at the end of the operation, when the iris is opened. By the use of loading pots this fixture also grinds piston rings, etc. Machines thus equipped are said to be consistently showing floor to floor time of from half to one-third that of the conventional machine commonly used for this work. A single machine, it is claimed, has ground 25,000 piston rings per 10 hr. day with a helper to load the pots.

The following are among the features emphasized by the makers as underlying the high production of this machine: High table traverse allows the rapid exposure of work surface to the wheel face for depths of wheel feed well within the capacity of standard abrasive wheels. The wheel, therefore, actually cuts more material in a given time without friction and heat losses attendant upon slow traverse operation. Rapid sizing is obtained because the rapid application of relatively light cuts minimizes spring away or gouging action of the wheel and draws out the surface uniformly. A single lever controls all table motions. A foot pedal stops and starts the work. Heavy construction minimizes distortion and vibration, and allows accurate positioning in spindle feeding. The feed index mechanism is located by "feel" as well as by sight, permitting the operator to watch his work. The diamond-holder fixture swings out of the way, but can be located instantly at the previous position on the table by a single motion. A water supply is provided for cooling the diamond. Spindles are of the unit type and are exchanged as fast as a man can slide one out and put in another.

The machine is the design of R. L. Morgan, formerly principal owner of Churchill-Morgan-Crittlinger, Worcester, which concern was purchased recently by the Greenfield Tap and Die Corporation and forms a part of the machine tool division with which Mr. Morgan is connected. W. H. Chapman, formerly assistant to C. H. Norton, Norton Co., Worcester, is assisting Mr. Morgan in giving engineering service.

David J. Joseph was re-elected president of the David J. Joseph Co., waste material dealers, at the annual meeting held in Cincinnati Jan. 21. All of the other officers of the company were re-elected. Reports submitted at the meeting showed that the company had had a fair year and that the prospects were much brighter. The company during the year had branched out to a considerable extent, opening offices in Pittsburgh and yards at Chicago and St. Louis. A feature of the meeting was the presentation of a silver loving cup to Mr. Joseph from the officers and employees of the various offices of the company.

The Polytechnic Institute, 99 Livingston Street, Brooklyn, has inaugurated an evening course in metallography. Instruction is given by lectures and laboratory practice in a well-equipped metallographic laboratory. The course covers a study of the microstructure of iron and steel and the fundamental physical chemical principles. The course consists of 15 lectures given on Friday evenings at 6.30 and 15 2-hr. laboratory exercises on Friday or Monday evenings from 7.30 to 9.30 commencing Feb. 3. The class is limited to 30 and the fee is \$25.

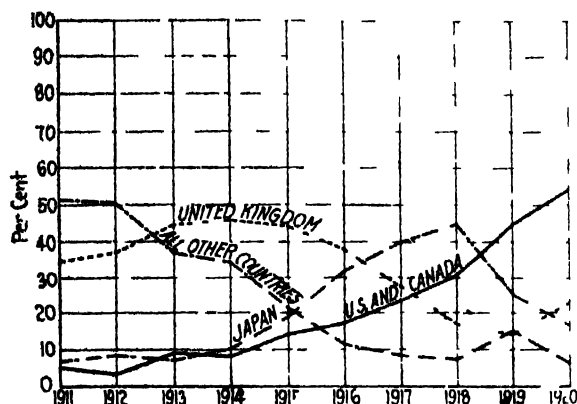
The Chapman Valve Mfg. Co., Indian Orchard, Mass., announces the completion of its new steel foundry, electrically operated throughout. The plant is 275 x 90 ft., the height to the crane rail being 22 ft.

CHINESE MACHINERY TRADE

Recent Changes in Commerce Between That Country and the United States

BY W. H. RASTALL*

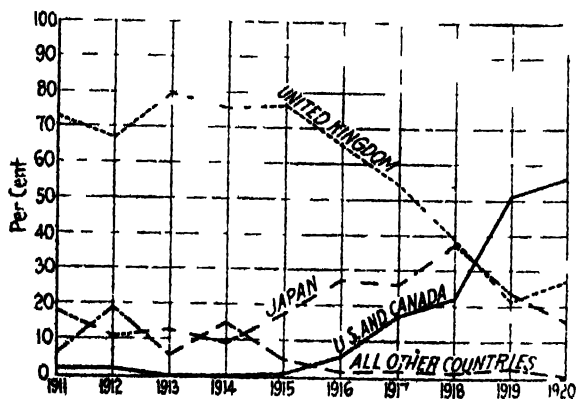
THE progress made by American machinery manufacturers in developing export business and the superior position of American engineering equipment in the markets of the world are shown very plainly by the experience in China since 1911, as illustrated very forcibly by the charts published herewith. It should be noted that these data are from Chinese



Division of Imports of Industrial Machinery into China According to Countries of Origin

not American sources, being developed from the returns of the Chinese Maritime Customs.

Conditions in China have differed radically from those in the other markets of the world because business there has been influenced very strongly by political forces, as has been called to public notice in connection with the armament conference. It has been customary to specify in loan agreements that the machinery required shall be purchased in the country furnishing the money, with the result that the United States supplied China only about 30 per cent of the machinery she imported in 1918, as compared with 80 per cent supplied in the same year to Japan, which is and has long been an openly competitive market. Consequently it should be recognized that the progress indicated below has



Division of Imports of Textile Machinery into China According to Countries of Origin

been made in spite of the difficulties encountered by those who sell machinery in China without financial assistance.

The customs authorities in China always credit consignments to the last port of shipment, so that machinery built in the United States and shipped to China via Vancouver would be credited as from Canada. In recent years very important amounts of machinery have been shipped in that way, and for this reason the

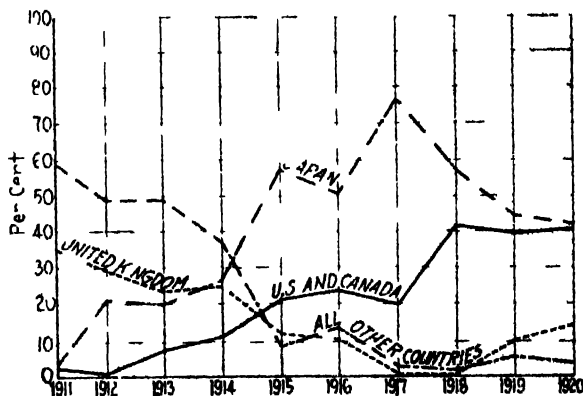
charts show the total of the shipments from the United States and Canada, as it is felt that practically all of the machinery leaving Canada originated south of the boundary. Similarly it should be remembered that the shipments from "other countries" include not only machinery from Germany but important shipments from Holland, Belgium, Sweden and other sources, although in the period prior to 1914 Germany was the most important of these sources of supply.

The progress made has been shown as a percentage in order to demonstrate clearly the comparative position of American exports in the China machinery trade, but this is a rather inadequate expression of the true situation, as there has also been a most astonishing increase in the volume of this business, making it worth while to submit the following figures showing the value of the shipments of the leading countries. These values are given in Haikwan taels, the exchange value of which fluctuates very seriously, being worth about 65c. in 1911, \$1.03 in 1917, etc.

Value in Haikwan Taels of Machinery Imports into China (Excluding agricultural, embroidery, knitting and sewing machinery)

Year	U.S.A. and Canada	United Kingdom	Japan	Total from All Sources
1911	34,074	330,209	461,122	6,561,020
1912	179,803	1,122,916	385,475	4,704,485
1913	673,227	3,241,690	548,522	7,137,042
1914	1,811,170	3,719,119	8,229,34	8,157,270
1915	1,772,2	1,934,518	851,185	4,485,867
1916	1,075,30	2,150,903	1,991,031	6,131,258
1917	1,411,141	1,648,863	2,419,813	5,982,716
1918	2,390,332	1,113,04	1,569,909	7,860,290
1919	4,017,727	1,071,315	3,604,905	14,828,249
1920	1,181,343	5,23,026	3,27,604	22,536,254

From this table and also Chart I it is evident that American machinery exports to China have increased



Division of Imports of Machine Tools into China According to Countries of Origin

100 per cent since 1911 and the American share of this business has increased from 5.8 per cent, the lowest of the countries here mentioned, in 1911 to 54.1 per cent, or more than all others combined, in 1920.

Even this statement does not adequately describe the situation, because American machinery trans-shipped in Japan, especially for points in North China and Manchuria, is credited to Japan in the above returns. Unfortunately, it is not possible to submit figures to show the volume of this trans-shipment business but there is reason to believe it is very large and during the war was strongly influenced by the demand in Siberia for war equipment.

The above refers to the experience covering all classes of machinery. If one wishes to be more specific, it is possible to submit corresponding charts regarding particular classes of machinery and in Chart II is a corresponding record of Chinese imports of textile machinery. In this diagram the line representing Japan is also deceptive, as a considerable amount of the textile machinery exported from Japan is of a type employed in cottage industries, as distinguished from the factory machinery shipped from Europe and America. For Americans the interesting part of the diagram is the comparison between the experience of the United States and the United Kingdom in this trade. The superiority of American engineering as represented by cotton mill design and cotton mill equipment has been clearly re-

*Chief of Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

equipped in China as also certain other countries, and it is anticipated that European designs will soon incorporate certain American features. The values involved in this trade are as follows:

Value in Haekwan Taels of Textile Machinery Imports into China

Year	U.S.A. and Canada	United Kingdom	Japan	Total From All Countries
1911	7,161	211,234	60,159	331,582
1912	6,885	307,283	50,229	458,616
1913	2,615	672,150	112,500	839,724
1914	2,536	1,546,100	187,661	2,038,460
1915	15,416	1,076,229	253,490	1,419,511
1916	115,131	1,257,961	531,437	1,934,141
1917	218,928	669,619	302,607	1,235,800
1918	379,867	669,192	642,948	1,714,994
1919	1,941,350	813,254	897,760	3,767,406
1920	3,897,201	1,925,696	1,071,201	6,927,728

It is thus clear that the textile industry in China is growing rapidly, and that the American interest in the trade is making even more rapid progress.

Correspondingly, Chart III illustrates the experience in connection with machine tools. This class of machinery is of a type that is strongly influenced by the loan and concession agreements, being used very largely in connection with railroads, mines, arsenals, dockyards, etc., and it is this that explains, to a large ex-

tent, the situation in 1919 and 1920. This government's experience is largely self-explanatory, but the above remarks regarding the trans-shipment of machinery from Japan should be remembered. It is true that Japan is trying to develop a machinery building industry and has paid especial attention to the production of machine tools, having more than 26 shops engaged in this business in 1918. It should also be remembered that Chart III is plotted in percentages, so that the high value shown on the Japanese curve for 1917 is deceptive. In that year European and American manufacturers shipped very little of this class of machinery because of the war embargoes. The volume of this machine tool business is shown in the following table:

Value in Haekwan Taels of Machine Tool Imports into China

Year	U.S.A. and Canada	United Kingdom	Japan	Total From All Countries
1911	615	9,699	1,067	27,726
1912	133	5,726	4,112	19,629
1913	3,773	12,112	10,234	51,288
1914	11,001	24,040	25,771	96,912
1915	15,494	9,052	42,094	72,811
1916	23,403	10,772	49,740	97,778
1917	40,983	1,254	160,475	208,894
1918	145,547	2,598	198,954	349,108
1919	197,859	50,477	221,996	499,858
1920	305,780	111,038	316,636	781,073

Gas Burning Equipment Installed on Large Core Oven

Details of Construction—Data on Performance
—Temperature Regulation—
Operating Cost

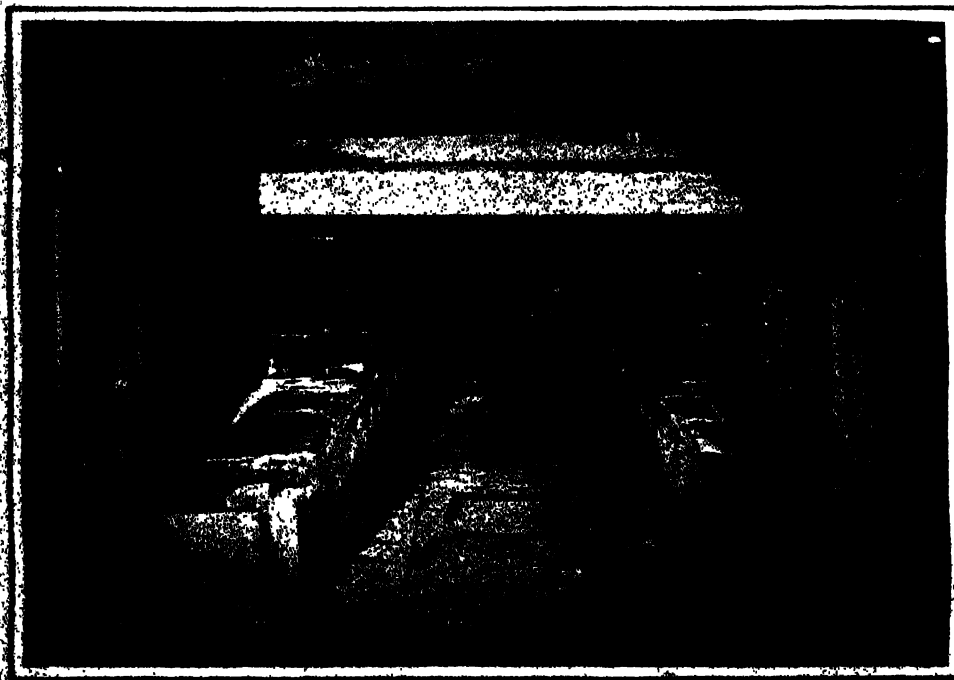
BY W. M. HEPBURN*

A SUCCESSFUL installation of gas burning equipment was recently made on a large core oven of the Gardner General Foundry, Gardner, Mass. The apparatus used was furnished by the Surface Combustion Co., New York, and was designed to burn the gas with the proper amount of air for complete combustion, gas-air proportions being maintained constant automatically. The issuing products of combustion entrain as they enter the oven either fresh air, oven atmosphere or any desired combination of the two. By this means the gas is burned at its greatest efficiency, the dilution taking place only after the combustion has been completed. Products of combustion issue from a special type of burner at a high velocity, and this energy

is utilized to entrain the quantity of air required to maintain the desired oven atmosphere, at the same time transforming the small quantity of high temperature products to a larger quantity of comparatively low temperature drying gases.

The oven was of the coke-fired car type, constructed of red brick, and measured internally 9 ft. wide, 25 ft. long and 6 ft. high. It accommodated three steel cars each having a loading space 8 ft. long by 5½ ft. wide upon which the large cores were loaded. The oven was formerly fired with coke and had two fire boxes, one at the left-hand rear corner on one side; the other at the right-hand front corner at the other side. One flue runs from the bottom of the oven and two from the top to a stack approximately 30 ft. high.

*Engineering department, Surface Combustion Co



Two Fire-Brick Ducts Extend Down Either Side, as Shown. A circular tile at the entrance of each duct forms a throat into which the burner fires. The approach to the throat has two openings, one leading into the oven and the other through the front to introduce fresh air

In constructing the oven the fire boxes were bricked up and a special type of burner together with an inspirator supplying it were installed. These were placed at the front firebox, on either side of the car approximately 9 in. above the floor level, as indicated in the accompanying illustrations. Two fire-brick ducts 18 x 18 in. were built at the floor level and extended down either side, as shown, openings being provided at short intervals along the sides of each duct. These openings were placed at the sides in order to prevent sand from falling inside the duct and also to enable the top of the duct to be used as shelves for drying the smaller cores.

A circular tile was placed at the entrance of each duct, forming a throat into which the burners fired

cores, reveal a close relationship between cubic feet of gas used and pounds of cores baked, 1.04 of 550 Btu gas per lb. of cores being a representative figure. This would tend to indicate that with a substantial red brick construction, the heat losses of the oven are small compared to the heat absorbed by the work treated. This in turn means that it is of prime importance to accurately control the atmosphere within the oven.

The advantages of this type of firing lie in the complete utilization of the inherent advantages of gas fuel. With this method the Btu in the gas was utilized to generate heat energy, its velocity to condition the atmosphere, its distribution to maintain a rapid circulation. No other fuel contains so many inherent

Calculation of General Data for Test Three Run

Run No	From Deg	Temp in Deg	Humidity	Dry Bulb	Wet Bulb	Relative Humidity	Heat in Btu per lb	Heat in Btu per cu ft	Total Amt in cu ft	Total Amt in cu ft	Approx Rate of Change of Air
1	60	100	1.0	100	100	1.0	1.0	1.0	1.0	1.0	20
2	100	100	1.0	100	100	1.0	1.0	1.0	1.0	1.0	21.6
3	100	100	1.0	100	100	1.0	1.0	1.0	1.0	1.0	19

The approach to the throat was located just inside the front wall or door and provided with two openings, one at the top leading directly into the oven through which the oven gases could be drawn to cause air circulation, the other through the front of the oven through which fresh air could be drawn from the atmosphere. Dampers for each opening were provided so that the respective quantities of fresh air or oven atmosphere could be controlled as desired.

Burners of special design were lined with refractory capable of withstanding the highest temperatures and these in turn were connected to automatic proportion

advantage regardless of the cost. The ability to utilize the core oven as a humidity dryer of great importance especially with larger ceramic. In the ceramic industry the effects of humidity are well known. Little attention has been paid to this phase in drying

but however although not often the most serious. Another advantage was found in the versatility of the oven under the close control of the temperature. Temperature could be taken at the front, top and rear of the oven and be regulated to within 10 degrees at all three places. On the other hand it was unnecessary to bake an unusually large core together with a load of smaller cores. It was desirable in such cases to give the larger core extra heat and the temperatures were easily regulated to provide the additional heat at the particular location of the larger core, thereby enabling the uneven load to be uniformly baked.

The cost of a charge for this oven even in the simplest shape represents a value of \$75. Bad castings resulting from improperly baked cores run into losses which far exceed any possible difference in the fuel cost. The number of core ovens on high priced fuels already indicates that the progressive managers have found the fuel cost per hour a small percentage of the cost of baking cores.

The noteworthy features of this installation may be summarized as follows. Ability to maintain any desired atmosphere within the oven, uniformity of temperature, no regulation of the flues required, and the elimination of labor charges involved in firing, cleaning, fires, regulating dampers and repairs. Ability to duplicate desired conditions is also a feature. After the best conditions are once determined these can be reproduced as frequently and easily as desired.

Positive control of the draft eliminating the necessity of stack or stuck drafts is also an advantage.

Details of Construction

Gas	Flue	Heat in Btu per lb	Heat in Btu per cu ft	Front
1	1.0	1.0	1.0	1.0
2	1.0	1.0	1.0	1.0
3	1.0	1.0	1.0	1.0
4	1.0	1.0	1.0	1.0
5	1.0	1.0	1.0	1.0
6	1.0	1.0	1.0	1.0
7	1.0	1.0	1.0	1.0
8	1.0	1.0	1.0	1.0
9	1.0	1.0	1.0	1.0
10	1.0	1.0	1.0	1.0
11	1.0	1.0	1.0	1.0
12	1.0	1.0	1.0	1.0
13	1.0	1.0	1.0	1.0
14	1.0	1.0	1.0	1.0
15	1.0	1.0	1.0	1.0
16	1.0	1.0	1.0	1.0
17	1.0	1.0	1.0	1.0
18	1.0	1.0	1.0	1.0
19	1.0	1.0	1.0	1.0
20	1.0	1.0	1.0	1.0

The Arrangement of Burners and Ducts as shown in Plan Above Together with a Vertical Section of One of the Ducts. Below the plan detail of the burner connection are shown.

which were designed so that gas under pressure up to 10 lb. per sq in drew in from the atmosphere the proper quantity of air for complete combustion. These proportions of air and gas remained constant through all rates of burning, and the rate of burning was controlled through a single valve.

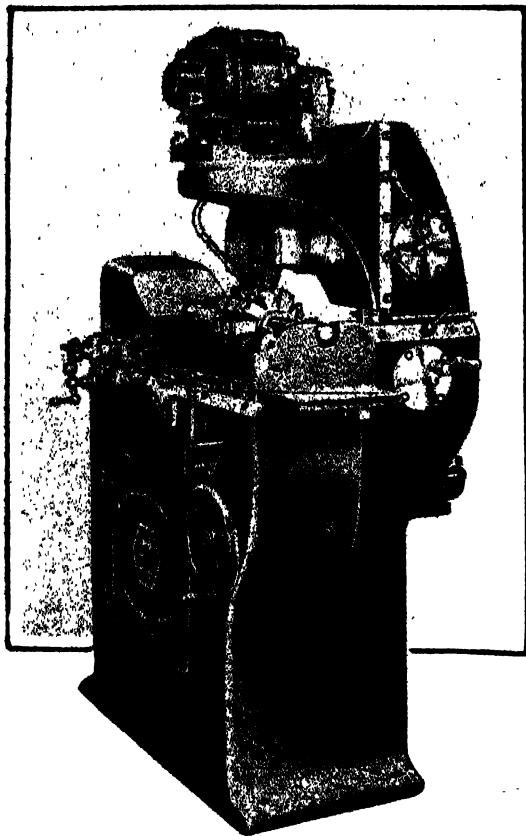
The accompanying figures relate to typical runs made in this oven. Data obtained from a number of runs with charges weighing from 6000 to 14,500 lb. of

Weight of cores 800 lb each
Total weight 7200 lb
Total gas used 1190 measured at 1 ft
Corrected to 3 in of H₂O 2940 / (11.7 + 13) = (147 + 0.1) = 7200 cu ft
Gas per lb of cores baked 7200 / 7200 = 1.04 cu ft.
550 Btu gas
Gas per cu ft oven content 7200 / 1350 = 5.33 cu ft.
With gas at \$1.25 per 1000 cu ft cost per 100 lb. of cores baked 7200 x 1.25 / 7200 = \$0.13

Improved Motor-Driven Hob Grinder

An improved motor-driven, universal, full-automatic machine for sharpening hobs with right or left hand spiral flutes or straight flutes has been placed on the market by the H. E. Harris Engineering Co., Bridgeport. It will also grind formed cutters, Curvex cutters or ordinary gear cutters, either singly or in gangs.

In the new machine two motors are used, one a 1 hp. motor belted directly to the wheel spindle as shown in the illustration, and the other a ½ hp. motor mounted on a bracket at the back of the machine and integral with it. Carrying all the intermittent or reciprocating actions on a separate drive is intended to provide uniform and smooth action in the wheel drive, as none of the shocks from the various operating mechanisms are transmitted through the motor to the wheel spindle to



One Motor Drives the Wheel, As Shown. Another motor mounted on a bracket at rear drives the intermittent and reciprocating mechanisms.

cause irregular action to the wheel. This arrangement is also said to result in less horsepower required and less current consumed.

The machine will index from 2 to 26 divisions and take hobs up to 8 in. in diameter and 10 in. long. The maximum angle of spiral possible at 8 in. diameter is 47 deg., either right or left. It grinds on both strokes of the table and indexes without stopping or dwell at the end of each return stroke. Indexing is by two plates, a working index plate and a master index plate, these being integral with each other and easily changed. Provision is made to adjust the front face of the teeth of the hob against the grinding wheel after all flutes have been ground. This is accomplished by rotating the hob toward the grinding face of the wheel, varying in amounts from 0.0002 in. to 0.005 in., as desired. This is done automatically and requires no attention when changing to a hob with a different number of gashes or flutes. The indexing is set in motion by a fixed trip dog on the machine frame operating directly on the index itself at the end of each return stroke, allowing the indexing mechanism to turn the index on the work spindle to the next index notch. No part of the table stroke is used to operate the indexing mechanism. The work-carrying or index head is rigidly built and excepting for the heaviest hobs, it is

not necessary to support the end of the hob with the tail center, a feature intended to save time in changing hobs.

The wheel is closely mounted to the overhead circular support, which is of large diameter and carried in a column of heavy construction. The support can be swiveled about the vertical center of the wheel for spiral hobs, and is graduated in degrees. The wheel spindle is carried in large bronze bearings having oil-well type lubrication and having provision for taking up thrust and wear. These replace the ball-bearings formerly used.

The machine is equipped completely for wet grinding, flooded lubrication of both the wheel and the work being provided. The machine may not only be set for radial grinding of the faces of hob teeth, but may be set also to compensate for the wear of the wheel. An adjustment is provided so that hobs may be ground undercut or with "hook" or "top rake" to the teeth. The work table is driven by a clutch reverse-gear mechanism operating a pinion in a rack, and stops on the front edge of the table permit adjustment to any length of hob within the capacity of the machine. All adjustments can be made conveniently by the operator from the front of the machine and many adjustments made while the machine is running.

Right or left hand spirals are generated without the use of change gears and may be adjusted to any lead angle by merely turning the ball crank handle at the left. This is done when the machine is either in motion or at rest. Graduations that give the lead angle in degrees and minutes are provided.

Expect to Limit Expenditures for Repairs

WASHINGTON, Jan. 31.—Failure marked the attempt of Representative Graham of Illinois to have the House incorporate an amendment in the independent offices appropriation bill last week to limit to \$1,000,000 the amount which the Shipping Board could expend for repairs on any one of its vessels without authority from Congress. The amendment was designed to prevent the board from proceeding with the work of reconditioning the Leviathan in the absence of an appropriation from Congress. The cost of doing this work, it is estimated, will be approximately \$8,000,000. Efforts are being made by the Massachusetts delegation in Congress to have the vessel reconditioned at the Boston Navy Yard and with this end in view Representative Dallinger of that State was successful in having an amendment incorporated in the appropriation measure which would give navy yards the right to submit estimates to the board for repair of its vessels. The navy yard figures can be only estimates and not specific bids such as are required of private interests and even if the Dallinger amendment passes the Senate, it is not considered likely that it will result in the work being done at a navy yard.

December Exports of Iron and Steel

Japan takes by far the leading place in American exports of iron and steel in December, according to the following table, prepared by the Department of Commerce. The total shipments amounted to 129,921 gross tons. The leading items sent to Japan comprised: Steel sheets, 29,812 tons; rails, 9650 tons; tin plate, 5974 tons; wrought pipe, 4272 tons; steel bars, 3185 tons; plain wire, 3157 tons; wire rods, 2209 tons, and wire nails, 1918 tons.

	Gross Tons	Per Cent of Total
Japan	62,182	47.86
Canada	26,147	20.05
Mexico	8,507	6.51
British India	8,056	6.20
China	5,530	4.26
United Kingdom	2,372	1.83
Argentina	2,141	1.65
Cuba	2,139	1.65
Brazil	1,825	1.41
Philippine Islands	1,814	1.40
Hongkong	1,611	1.24
Kwantung (leased territory)	1,520	1.17
Scattering	5,328	4.10

AN IRON AND STEEL EXPORTS

Part of 1921 Shows Sharp Expansion—Comparisons with Other Years—Imports
(Special Correspondence)

BERLIN, GERMANY, Jan. 6.—As far as it is possible to judge from available data (the returns for the period Jan.-April, 1921, not having been published as yet), October will probably figure as the most noteworthy month last year in German iron and steel exports so far as absolute figures are concerned. Exports of iron and steel and products thereof, not including machinery, amounted to 246,115 metric tons valued at 1,267,789,000 m., as compared with 225,331 tons valued at 1,233,039,000 m. in September, and 234,249 tons valued at 1,764,373,000 m. in November.

STILL IN DOUBT

Attitude of Attorney General As to Trade Associations Not Determined

WASHINGTON, Jan. 31.—Announcement by the Government outlining its policy with regard to trade associations continues to be an indeterminate matter. Attorney General Daugherty this afternoon said that a new draft of a statement had been prepared which he and Secretary of Commerce Hoover might put out jointly, but added that this had not been agreed upon by any means. He further stated that he does not know that anything will come from the Department of Justice except a statement to aid the Department of Commerce. It is the position of the Attorney General that the decision of the Supreme Court in the Hardwood

Iron and Steel

Product	Exports		Countries	Imports	
	Oct.	Nov.		Oct.	Nov.
Pig iron, including ferroalloys, scrap, etc.	50,381	38,976	Great Britain	55,619	48,512
Piping and pipe shapes of non-malleable material	3,304	1,947	Holland	3,312	1,819
Hardware and other non-malleable iron ware	6,421	6,076	Holland	132	124
Semi-finished materials, rails, crucible steel, blooms, etc.	3,767	2,513	Great Britain	25,992	11,746
Bar iron, section iron	52,022	51,583	Belgium	35,617	16,889
Sheets and plates of all kinds, including tin plate	25,881	27,395	Holland	5,005	2,159
Wire, rolled and drawn, rough and finished	15,730	13,491	Holland	6,083	8,129
Tubing and piping, rolled and drawn, rough and finished	8,014	9,845	Eastern Asia	251	422
Rails, ties, fishplates and other track supplies	26,329	28,825	Holland	8,800	4,397
Railroad axles, car wheels, buffers, springs, etc.	4,422	4,316	Holland		
Malleable iron ware, rough and machined, including boilers, tanks, containers, machine parts, steam fittings, etc.	14,416	14,856	Northern Russia	30	19
Bridges and parts thereof, other structural material	4,613	4,625	Northern Russia	1,244	591
Bolts, nuts and rivets of all kinds	2,726	2,486	Holland	108	70
Wire nails, etc.	6,494	6,310	Holland	645	462
			Eastern Asia	18	18
Machinery					
Locomotives	3,753	4,542	Balkans, Spain	23	4
Steam engines and other prime movers, tractors	2,833	2,857	Sweden	90	53
			Holland		
Machine tools	4,331	4,891	France	135	31
Agricultural machinery	2,071	2,201	Belgium	197	82
Textile machinery	2,926	3,075	Holland	287	61
Automobiles, including chassis; also motor trucks	1,415	1,790	Holland	116	39
Automobiles, number of cars and trucks	670	1,000	Holland	81	70
Motorbicycles, number of engines	300	211	Holland	10	5
			Denmark		

The import figures are 146,695 tons for October, 106,519 tons for September, and 94,222 tons for November.

Striking features of the November returns are the decrease in shipments of pig iron, semi-finished products, bar iron and wire and the increase in sheets, plates, rails, tubing and machinery. Broadly speaking, most of the November figures are lower than the October figures, but still higher than those for September. The notable increase in exports of rails and track supplies to southeastern Asia; British India; Malacca; Ceylon, French, Dutch, and Portuguese Indies; Philippines and Siam deserves mention. Of the totals, 2042 tons, or 5 per cent, was shipped in September, against 3953 tons, or 11 per cent, in October, and 5482 tons, or 18 per cent, in November. As in September, Northern Russia again heads the list in this department.

The swelling of import figures for October and, to a lesser extent, November, is mainly attributable to heavy shipments of pig iron, scrap, old materials, semi-finished products, and a few other commodities by Luxembourg and Alsace-Lorraine.

A tabulation of most of the exports and imports, showing principal importing countries, is given below for October and November. The quantities are metric tons.

Further details of German steel exports and imports for 1921 by months, as compared with other periods, follow:

German Iron and Steel Exports and Imports in Metric Tons		
1921	Exports	Imports
May	129,847	42,880
June	162,297	47,013
July	177,773	55,104
August	340,035	70,008
September	225,331	106,519
October	246,115	146,695
November	234,249	94,222
Total, 7 months, 1921	1,415,647	563,441
Average per month	202,235	80,491
1920, average per month	145,983	34,350
1919, average per month	10,300	33,699
1918, average per month	179,869	23,766

case was explicit as to its meaning, and the department cannot discuss a subject that would make courts think it necessary for the Department of Justice to supplement a decision of the Supreme Court.

It was made clear by the Attorney General that the Department of Justice will not undertake to explain away any decision that might be interpreted as trying to modify a decision or that would "muddy the water" of cases now being prosecuted. It was pointed out that the question is how far trade associations can go in distributing information among their members exclusively as to prices and as to whether the information should be made public and in what manner. The Department of Justice apparently is determined to guard itself against allowing any efforts at violation of the law that might be attempted by use of a statement issued by the department. However, the department still hopes that it will be able to work out a plan to serve as a guide to trade associations, but with the distinct purpose that nothing will be done that might stand in the way of the Hardwood decision.

It is understood that one plan in mind is to have trade associations make information public so as to overcome that feature of the Hardwood decision which condemned the practice of limiting the information to members of the Hardwood association only. This information, it is said, would take on the nature of averages as to production, stock and prices and would not deal with such statistics for individual members of trade associations. It is a question as to how the information would be distributed. Use of the Department of Commerce as the agency for this purpose, it was pointed out, might not be satisfactory on account of the delay incident in preparing the reports and forwarding them to Washington and also by reason of the time this would require, it is contended that the value of the information would be either greatly lessened or entirely destroyed.

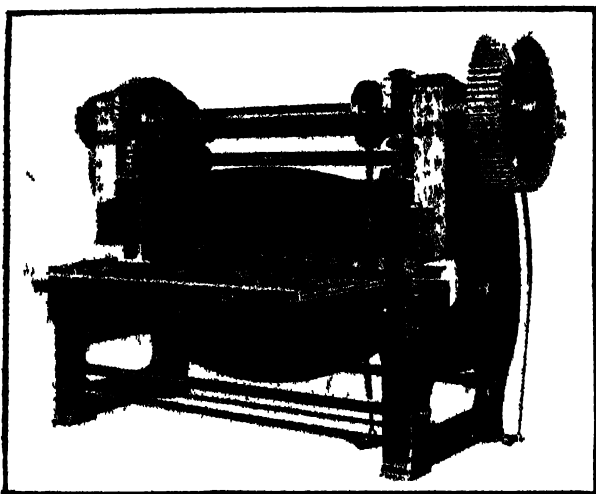
The most logical solution of this problem, according to some officials, would be to use the trade papers as a means for distribution of trade information.

Improved Gap Shear*

A gap shear for cutting $\frac{1}{8}$ in. and lighter annealed steel, and incorporating features of improved design, has been added to the line of shearing machinery offered by the Strine Tool & Mfg Co, New Bremen, Ohio.

An outstanding feature is the new design of the cutter bar or cross head which is of double ribbed and cross ribbed box type construction, as shown in the illustration and provided with long cross head bearings fitted into the slides of the housings by means of adjustable hand scraped taper gibs. This construction is intended to eliminate the use of truss rod or hog chain to keep the cutter bar from springing under strain. The long cross head bearings with adjustable taper gibs are to prevent the cutter bar from tilting while cutting and thus to permit cutting a clean smooth edge.

The cutter bar is connected to the eccentrics by ad-



The Shear B 111. Deeply Ribbed and is Adjustable to Suit the Work. The cutter bar is of double ribbed and cross ribbed construction as shown in view of right.

justable links, thus allowing the shear knives to be set by raising or lowering the cutter bar, either to split long stock or to plain shearing to the full length of the knives. The hold down or clamp is automatically operated and equipped with compensating springs to take care of unevenness in the thickness of the metal to be sheared.

A full set of front, side and back gages is provided, the back gage being of the parallel-screw and miter gear operated type. It is operated with a crank handle and the miter shaft is made of two pieces, joined by a sleeve, which can be loosened and the gage set parallel with blades or otherwise without loss of time.

The shear bed is deeply ribbed and can be adjusted to suit the requirements of the work. Parallel graduations in sixteenths of an inch are marked from the edge of the shear blades to the ends of the front gage supports thus permitting quick and accurate setting of the gages. The eccentrics are double keyed and shrunk on the eccentric shaft, the bearings of which are split and can be readily adjusted or replaced. All shafts are of large diameter and gears machine cut, the gears being made of semi-steel castings and the pinions of steel forgings. The clutch is of forged steel and is fitted with tool steel clutch pin and finger.

This shear can also be arranged for motor drive or equipped with a long squaring arm. The machine illustrated is the 6 ft shear but other lengths can be supplied. The specifications give length of shear blades as 74 in. and approximate weight of the machine as 18,500 lb. The flywheel pulley is 42 in. by 7 in., weighs 1260 lb and runs at 280 r.p.m. The strokes of the cutter bar are 18 per min., and the ratio of gearing 16 to 1. The floor space required is 84 by 120 in. A 15-hp. motor, 900 to 1800 r.p.m., is recommended.

Thermal Stresses in Steel Car Wheels

On Dec. 10 a conference was held at the Bureau of Standards, Washington, to discuss the accumulated data obtained in thermal tests of steel car wheels. Representatives of various manufacturers and purchasers of steel wheels were present. The results obtained in the tests of 16 wheels completed to date were discussed, the interesting features of which may be summarized as follows:

None of the steel wheels failed.

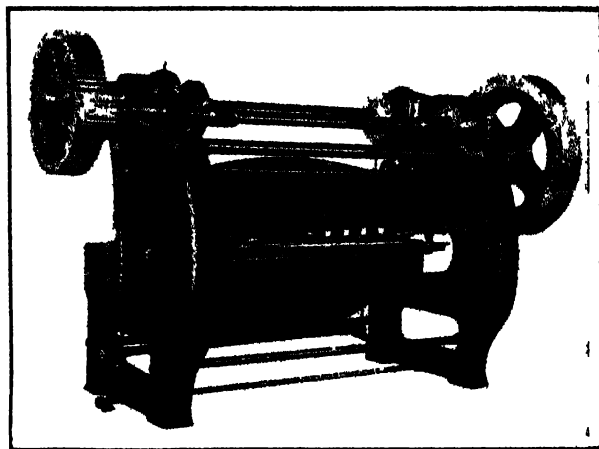
Because of the movement of the hub with respect to the rim on account of the heating of the rim a beam effect is produced in the plate which induces tensional stresses near the hub and stresses in compression near the rim on the face of the plate while on the back of the plate the stresses are approximately equal in magnitude but reverse in nature.

These effects were observed in new wheels while in the case of old wheels the stresses on the face of the plate were in tension near the hub and at the rim they decrease to practically nothing this difference from the new wheel probably being due to the quantity of metal worn away.

The magnitude of the maximum stresses developed approximated the yield point of the material as determined in tensile tests.

After the first run on the new wheels an apparent set was obtained which was not the case in succeeding runs nor in run on old wheels. The maximum stresses were in the surface of the plates and beyond the yield point of the material.

It was suggested by one representative that tests on wheels with thinner plates be made in order to



determine the effect of plate thickness on induced stresses. One of the steel companies expressed a willingness to furnish wheels for this test and the matter is now being considered.

Further work on single plate chilled iron wheels seems justified in view of the fact that a survey of the stresses on the back of the plate of this type of wheel was not made. From experience with the steel wheels, it is believed that the stresses will be quite different from those on the face.

The stockholders of the Bridge & Beach Mfg. Co., St. Louis, have re-elected the following directors: Hudson E. Bridge, L. H. Booch, Henry C. Hoener, John F. Shepley, Louis H. Riecke, Laurence D. Bridge and George Leighton Bridge. The board elected the following officers: Hudson E. Bridge, president and treasurer; L. H. Booch, vice-president and manager; Henry C. Hoener, vice president; Louis H. Riecke, secretary; George Leighton Bridge, assistant secretary; A. F. Gammeter, assistant treasurer; Laurence D. Bridge, assistant treasurer.

The Laconia Car Co., Laconia, N. H., is delivering cars on repair contracts at the rate of 32 per week, but shortly expects to increase this to 40 cars. The company has sufficient car repair work on its books to keep its plant operating at its present capacity until Nov. 1, next. The company's foundry is inactive, however.

Obsolete Naval Vessels Sold

Philadelphia, Jan. 31.—The Henry A. Hitner's Sons Co., Philadelphia, has been awarded eight of the nine obsolete naval vessels recently offered for sale by the Navy Department. This salvaging company's aggregate bid for the eight vessels was \$235,000, which was submitted on the basis of "all or none." The vessels going to the Hitner company include the battleships Maine, Missouri and Wisconsin; the cruiser Columbia, and the monitors Puritan, Ozark, Tonopah and Miantonomah. The ninth ship, the old cruiser Memphis, was awarded to the A. H. Radetsky Mine & Metal Co., Denver, for \$3,000. The Memphis is a wreck on the shores of Santo Domingo.

The salvaging of these obsolete ships will occasion the greatest undertaking of this kind ever engaged upon in the United States, and is regarded as a possible forerunner of the establishing of a regular ship salvaging industry on a broad scale, provided terms of the conference on the limitation of armaments are finally agreed upon and a permanent and adequate American merchant marine is created.

Proposed Reduction of Miners' Wages

PITTSBURGH, Jan. 30.—An echo of the recent refusal of operators in the different fields of the so-called central competitive district to enter into preliminary conferences with representatives of the United Mine Workers of America, to discuss a new wage scale to become effective with the expiration of the present one on March 31 next, is found in an announcement late last week by the Pittsburgh Coal Producers' Association and the Southern Ohio Coal Operators' Association setting up new scales to become effective April 1 next, which reduce wages roughly from 30 to 40 per cent. The check-off system, whereby the operators collected and paid over to the union the dues of workmen, is eliminated, and when the United Mine Workers of America meet in Indianapolis on Feb. 14, for the annual wage scale convention, they will also have to consider dealing with the operators in the several districts individually, instead of for the entire so-called central competitive district as has been the case heretofore. A was to be expected, the action of the Pittsburgh and southern Ohio district operators find disapproval among union leaders and already there are suggestions of a strike, as of April 1.

Roofing Shingles of Copper

The Anaconda Copper Mining Co. has secured a contract to cover with copper shingles the roof of the new Holy Innocents Church in Brooklyn. This shingle comes in three sizes—6 x 18 in., 8 x 18 in. and 8 x 60 in., and weighs approximately 84 lb. a square of 100 ft. a light material for roofing purposes. This weight compares with 200 lb. for the wooden shingle, 400 to 600 lb. for asbestos, 750 to 1200 lb. for slate and 1000 to 2000 lb. for tile of the same area. Anaconda's shingle is made of a specially developed grade of copper 99.95 per cent pure. The present plant at Perth Amboy, N. J., which will start operations Feb. 1, can turn out more than 500 squares daily. Its capacity will be increased to meet demand.

Electrical Properties of Titanium Alloys

The electrical properties of titanium alloys have been investigated at the Rensselaer Polytechnic Institute, Troy, N. Y., and the investigation is the subject of No. 12 of the Engineering and Science Series of that institution, published by the authors, M. A. Hunter and J. W. Bacon. A summary of the results of the investigation is as follows:

The addition of titanium to iron improves the magnetic quality of the iron. The magnetization curves are invariably higher and the hysteresis losses lower than in an untreated specimen.

The action is attributed to a cleansing of the material by the addition of titanium. If additions are made in such amounts that titanium is left in the iron, the material impurities are no longer apparent. The samples will under

these conditions be lower in magnetic quality than the original iron.

Good results were obtained by treating silicon-iron with titanium. These alloys gave an exceedingly high permeability and low hysteresis loss.

The aging of the titanium-treated specimens was of the order of that of iron, though somewhat less in degree.

Alloys of titanium with nickel, copper, nickel-iron and nickel-copper were made. The specific resistance of these materials are only moderately high for additions of titanium up to 5 per cent. Beyond this point the alloys are exceedingly hard to draw. Such wires as were made can be run continuously only at low temperatures by reason of their tendency to oxidation when run at a red heat.

Sheet Metal Contractors' Association

At the annual convention of the Sheet Metal Contractors' Association of Pennsylvania, held in Reading, Pa., Jan. 26 and 27, the following officers were elected: President, Louis Luckhardt, J. D. McIlroy & Sons, Pittsburgh; first vice president, Charles A. Bachman, Easton, Pa.; second vice-president, Joseph Urban, Reading, Pa.; secretary, W. F. Angermeyer, W. F. Angermeyer & Co., Pittsburgh; treasurer, G. C. Krack, Gus. A. Krack & Sons, Erie, Pa.; directors, W. H. Tinney, Philadelphia, and N. F. Bantam, Wilkes-Barre, Pa. Announcement was made of the organization of the salesman's auxiliary affiliated with the association. Officers of the auxiliary follow: President, Thomas E. Cook, Philadelphia; first vice-president, Warren Carter, Philadelphia; second vice-president, C. J. Deshore, Philadelphia; secretary, Oliver C. Brooks, Philadelphia; treasurer, William Gowan, Pittsburgh. Directors, George J. Claudice, Baltimore; Thomas Quinn, Philadelphia; George Gock, Philadelphia; John Follansbee, Pittsburgh, and George Johnson, Pittsburgh.

Anaconda's Acquisition of American Brass Co.

The acquisition recently of the American Brass Co., Waterbury, Conn., by the Anaconda Copper Mining Co., has been referred to by officials of the latter company as a step that will place the company's business on a sound foundation. The Anaconda company, in the five plants east of the Mississippi River which it has acquired, has a capacity equal to approximately 40 per cent of the total copper and brass manufacturing business of the country. The acquisition of the brass company will mean the absorption of practically the entire copper output of the Anaconda Copper Mining Co. by the new subsidiary. In June, 1918, the Anaconda company opened a wire mill at Great Falls, Mont., which up to the end of last year had rolled into rods and drawn into wire 166,000,000 lb. of copper.

The Anaconda company has been a producer of copper, zinc, lead, gold, silver, ferromanganese, sulphuric acid, copper rods and wire, copper and zinc shingles white lead, etc.

Corrosion of Steels

Laboratory work relating to the determination of the relative resistance of certain alloy steels to corrosion when submitted to combined weathering and immersion in distilled water was completed recently by the Bureau of Standards. Based on exposure of 19 days, the polished samples of steel showed the best resistance to corrosion in the order given below:

Annealed stainless steel (carbon, 0.15; chromium, 13 per cent)

Annealed high chromium and high nickel steels
Forged stainless steel

Cast iron chromium alloy (carbon 0.01, chromium, 6.5 per cent)

Annealed chromium steel (carbon, 0.20, chromium, 8.6 per cent)

Annealed chromium steel (carbon, 0.30, chromium, 5.72 per cent)

Annealed chromium steel (carbon, 0.38, chromium, 3.90 per cent).

Pure iron.

Iron carbon alloy (carbon 0.45 per cent).

List Prices and Discounts on Steel Castings

American Steel Foundries Makes Public New Method of Quoting Its Products—Important Departures from the War Committee Schedules

THE American Steel Foundries, Chicago, manufacturer of steel castings, with plants distributed throughout the country, has announced list prices and discounts on its products, effective Feb. 1. The new prices cover 30 different classes of castings under which 195 separate discounts are listed. The classifications, the prices and the discounts were worked out after two years of exhaustive study by the company, and are believed to be on the lowest possible basis compatible with the costs of any producer in the industry.

The idea of preparing quotations of general application is not a new one in the steel castings field; neither is it an innovation to make a careful study of the costs of different classes of casting work with the view of arriving at proper spreads in prices. For some years prior to the war, the steel foundry industry carried on an investigation of costs, and during the war, at the instance of the Committee on Steel and Steel Products of the American Iron and Steel Institute, maximum prices were established which prevailed throughout 1918. This schedule, it is to be noted, remained in effect notwithstanding uninterrupted increases in labor costs. With the coming of the armistice and the subsequent efforts of the Government to stabilize prices on a lower level through the medium of the Industrial Board of the Department of Commerce, the same committee which represented the steel castings industry in establishing the war schedule prepared new prices which were $12\frac{1}{2}$ per cent below those previously in force. While these prices were never submitted to the Industrial Board, they were generally used by the industry for the remainder of 1919. In 1920 advances in the cost of labor and raw materials made two increases necessary—one in the first quarter and the other in the second quarter. Since the beginning of 1921, prices have declined steadily, and here and there in the industry business is known to have been taken at a loss.

The new prices and discounts announced by the American Steel Foundries will tend to discourage the taking of business at a loss in lean times and likewise restrain the naming of excessive prices in brisk periods. Prices, of course, should have a proper relation to costs, and in this respect it is felt that the new list will prove an education to the buying public.

The schedule of the American Steel Foundries differs in a number of important particulars from the maximum war prices of 1918. In the latter, separate prices were fixed for each class and subdivision of that class. The new schedule carries only 17 list prices graduated according to weight, and 12 extras for carbon, nickel, chrome content, etc. It is felt that this method of quoting is far simpler than that followed during the war and therefore more intelligible to the trade. In the war schedule there was no uniformity in the gradations of prices per weight. For example, under "Propeller Wheels" separate prices were quoted for weights 101 to 300 lb. inclusive, 301 to 600 lb. inclusive, 601 to 1000 lb. inclusive, etc., while under "Crane Castings" separate quotations were named for weights 1 to 10 lb. inclusive, 11 to 25 lb., 26 to 50 lb., etc. Under the American Steel Foundries schedule, the same weight classification applies to all castings. The list prices fixed for each division of weight will remain unchanged, but the discounts will vary from

time to time according to market conditions. A similar method of quoting has long been the rule on steel pipe, bolts and nuts, and valves and fittings.

The new schedule is also more specific than that of the war period. Whereas the general classifications are similar to those used for war prices, many more component items are included. Where a single price was quoted for a class under the war schedule, the American Steel Foundries names separate discounts for all of the important kinds of castings composing that class. Thus due allowance is made for differences in design and size of product.

Under the appended list prices and discounts, freight is allowed to customers whose plants are located within the area demarcated by a line drawn from Boston through Schenectady, Rochester, Niagara Falls, Detroit, Duluth, St. Louis, Cincinnati, Washington, Cape May, N. J., and other Atlantic ocean terminal points between Cape May and Boston. Customers located outside of this territory will pay the freight from the boundary line. This is the same practice which was employed under the war-time prices, and is explained by the fact that most of the steel foundry capacity of the United States lies within the territory above defined.

List Price of Steel Castings per 100 lb., According to Unit Weight

These prices cover steel castings produced in accordance with the requirements of the American Society for Testing Materials—standard specifications for steel castings

Over 1 to 10 lb each	\$32.60
Over 10 to 25 lb each	32.40
Over 25 to 50 lb each	17.95
Over 50 to 75 lb each	15.55
Over 75 to 100 lb each	14.65
Over 100 to 150 lb each	13.45
Over 150 to 200 lb each	12.85
Over 200 to 300 lb each	11.90
Over 300 to 500 lb each	11.80
Over 500 to 750 lb each	10.60
Over 750 to 1 000 lb each	10.80
Over 1 000 to 2 000 lb each	9.80
Over 2 000 to 3 000 lb each	9.35
Over 3 000 to 5 000 lb each	9.20
Over 5 000 to 10 000 lb each	8.95
Over 10 000 to 50 000 lb each	8.60
Over 50 000 lb each	9.95

Extras to Be Added to Net Prices

For carbon, 0.30 to 0.70 per cent	Add \$0.25 per 100 lb.
For carbon, 0.70 to 1.00 per cent	Add 0.50 per 100 lb.
For carbon, 1.00 to 1.25 per cent	Add 0.75 per 100 lb.
For carbon, 1.25 to 1.50 per cent	Add 1.00 per 100 lb.
For carbon, 1.50 and over	Add 1.75 per 100 lb.
For $2\frac{1}{2}$ to $3\frac{1}{2}$ per cent nickel	Add 3.00 per 100 lb.
For 0.18 per cent vanadium	Add 3.40 per 100 lb.
For 1 per cent chromium	Add 1.50 per 100 lb.
For 1 per cent chromium and 2 per cent nickel	Add 3.25 per 100 lb.
For 1 per cent chromium and 0.1% per cent vanadium	Add 4.90 per 100 lb.
For any portion of titanium	Add 1.00 per 100 lb.
For steam test on any castings	Add 0.50 per 100 lb.

Freight Allowance

The prices obtained after applying the discounts cover the castings in the rough, f.o.b. our works with published rate of freight allowed to the freight station of the purchaser, other than railroads, located within a line drawn from Boston through Schenectady, Rochester and Niagara Falls, N. Y., Detroit, Duluth, St. Louis, Cincinnati, Washington, Cape May, N. J., and other Atlantic Ocean terminal points between Cape May and Boston. Prices to railroads are f.o.b. our works with published rate of freight allowed to the nearest point on the line of their road located in the territory mentioned above. For deliveries outside of the territory mentioned on shipments to all purchasers freight will be allowed only to the boundary line; the excess to be paid by the purchaser.

Castings as of Feb. 1, 1922, According to Class of Castings

Machine Castings	
In lots of 100 to 249 pieces.....	50 per cent
In lots of 250 to 499 pieces.....	55 per cent
In lots of 500 and over.....	60 per cent

Blast Furnace Castings	
Gears, pinions, segments and racks.....	*
Worms, worm wheels, sprockets, sheaves and pulleys.....	*
All other castings used in the construction or repair of blast furnaces.....	25 per cent

Boiler Castings, Flanges and Fittings	
Ammonia fittings.....	10 per cent
Ball and socket joints for dredges.....	25 per cent
Boiler saddles.....	25 per cent
Cross boxes.....	25 per cent
Crossovers.....	10 per cent
Dredge piping.....	25 per cent
Flanges, in lots of 1 to 49 pieces.....	35 per cent
Flanges, in lots of 50 to 99 pieces.....	40 per cent
Flanges, in lots of 100 and over.....	45 per cent
Handhole frames and covers.....	25 per cent
Headers.....	10 per cent
High-pressure flange fittings.....	25 per cent
Hydraulic fittings.....	25 per cent
Low-pressure flange fittings.....	10 per cent
Manhole frames and covers.....	25 per cent
Manifolds.....	10 per cent
Nozzles.....	25 per cent
Steam piping of heavy section.....	25 per cent
Steam piping of light section.....	10 per cent
Steam separators.....	10 per cent
Steam traps.....	10 per cent
Valve bodies.....	25 per cent
Valve parts.....	25 per cent

Bridge Castings	
Bridge blocks, column bases and shoes:	
In lots of 1 to 49 pieces.....	35 per cent
In lots of 50 and over.....	60 per cent
Gears, pinions, segments and racks.....	*
Worms, worm wheels, sprockets, sheaves and pulleys.....	*

Car Castings	
Bolster center fillers and rear draft lugs combined:	
Bolster center fillers and backstops combined:	
Center plates and bolster center fillers combined:	
Striking castings and center sill connections combined:	
Striking castings and front draft lugs combined:	
In lots of 1 to 49 pieces.....	35 per cent
In lots of 50 to 99 pieces.....	40 per cent
In lots of 100 to 249 pieces.....	45 per cent
In lots of 250 to 499 pieces.....	50 per cent
In lots of 500 to 999 pieces.....	55 per cent
In lots of 1,000 and over.....	60 per cent
Bolster center fillers, plain:	
Roping and jacking castings:	
Truck columns—box section:	
In lots of 1 to 49 pieces.....	40 per cent
In lots of 50 to 99 pieces.....	45 per cent
In lots of 100 to 249 pieces.....	50 per cent
In lots of 250 to 499 pieces.....	55 per cent
In lots of 500 to 999 pieces.....	60 per cent
In lots of 1,000 and over.....	65 per cent
Journal box wedges, cored type:	
Push pole pockets:	
Striking castings, plain:	
Truck columns, U section:	
Miscellaneous freight car castings:	
In lots of 1 to 49 pieces.....	45 per cent
In lots of 50 to 99 pieces.....	50 per cent
In lots of 100 to 249 pieces.....	55 per cent
In lots of 250 to 499 pieces.....	60 per cent
In lots of 500 to 999 pieces.....	65 per cent
In lots of 1,000 and over.....	70 per cent
Center plates, plain:	
Coupler carriers, plain:	
Draft lugs, short:	
Side bearings, plain:	
In lots of 1 to 49 pieces.....	50 per cent
In lots of 50 to 99 pieces.....	55 per cent
In lots of 100 to 249 pieces.....	60 per cent
In lots of 250 to 499 pieces.....	65 per cent
In lots of 500 to 999 pieces.....	70 per cent
In lots of 1,000 and over.....	75 per cent
Journal box wedges, solid type:	
In lots of 1 to 49 pieces.....	55 per cent
In lots of 50 to 99 pieces.....	60 per cent
In lots of 100 to 249 pieces.....	65 per cent
In lots of 250 to 499 pieces.....	70 per cent
In lots of 500 to 999 pieces.....	75 per cent
In lots of 1,000 and over.....	80 per cent
Journal boxes, all types.....	†
Passenger car castings, all types.....	†

Cement Mill Castings	
Gears, pinions, segments and racks.....	35 per cent
Riding rings.....	45 per cent
Rollers.....	35 per cent
Tires.....	*
Worms, worm wheels, sprockets, sheaves and pulleys.....	*
Miscellaneous castings for cement mills.....	35 per cent

Centrifugal Pump Castings	
Castings.....	†
Impellers.....	†
Miscellaneous castings.....	†

Copper Mine and Smelting Plant Castings	
Copper ladles.....	30 per cent
Copper molds.....	45 per cent
Copper bars.....	45 per cent
Slag ladles.....	30 per cent
Slag molds.....	45 per cent
Miscellaneous castings.....	40 per cent

Crane Castings	
Brake wheels.....	10 per cent
Bumper hoods.....	10 per cent
Center stern castings.....	10 per cent
Charging bar supports.....	10 per cent
End carriages.....	10 per cent
Gear covers.....	10 per cent
Gears, pinions, segments and racks.....	10 per cent
Guide brackets.....	10 per cent
Hollow shafts and stems.....	10 per cent
Long hollow rack castings.....	10 per cent
Motor supports.....	10 per cent
Peels and peel heads.....	10 per cent
Ram frames.....	10 per cent
Sheave guards.....	10 per cent
Stripper rams and sleeves.....	10 per cent
Trolley frames.....	10 per cent
Truck castings.....	20 per cent
Worms, worm wheels, sprockets, sheaves and pulleys.....	*
Miscellaneous castings.....	30 per cent

Die Blocks	
.....	50 per cent

Dredge Castings	
Ball and socket joints.....	25 per cent
Cutter heads.....	25 per cent
Dredge piping.....	25 per cent
Gears, pinions, segments and racks.....	*
Worms, worm wheels, sprockets, sheaves and pulleys.....	*
Miscellaneous dredge castings.....	†

Engine Castings	
Chambered pistons.....	10 per cent
Counter balances.....	45 per cent
Crank disks.....	45 per cent
Crank webs.....	45 per cent
Cylinder heads.....	10 per cent
Gas engine cylinders in one piece.....	*
Gas engine cylinders in two pieces.....	*
Flywheels.....	45 per cent
Flywheel hubs.....	45 per cent
Flywheel segments.....	45 per cent
Miscellaneous engine castings.....	30 per cent

Gears, Pinions, Segments, Racks, Etc.	
Gears, pinions, segments and racks:	
In lots of 1 to 49 pieces.....	40 per cent
In lots of 50 to 99 pieces.....	45 per cent
In lots of 100 and over.....	50 per cent
Machine molded gears.....	*
Railway motor gears.....	*
Worms, worm wheels, sprockets, sheaves and pulleys:	
In lots of 1 to 49 pieces.....	25 per cent
In lots of 50 to 99 pieces.....	30 per cent
In lots of 100 and over.....	35 per cent

Hammer Heads	
.....	50 per cent

Hammer Rams	
.....	50 per cent

Hydraulic Machinery Castings	
Accumulator cylinders:	
With walls over 1 1/2 in. thick and simple flange on one end.....	20 per cent
With walls 1 1/2 in. thick, or less, and with simple flange on one end.....	10 per cent
All other types of accumulator cylinders.....	net
Hydraulic press cylinders:	
Of plain surface with standard rectangular flange.....	35 per cent
Of irregular contour, with wings or special cored openings, and flanges.....	25 per cent
Head castings.....	50 per cent
Nut castings.....	55 per cent
Platen castings.....	50 per cent
Miscellaneous castings.....	40 per cent

Jaw and Gyratory Crusher Castings	
Gears, pinions, segments and racks.....	*
Gyratory crusher housings.....	25 per cent
Jaw crusher frames.....	25 per cent
Worms, worm wheels, sprockets, sheaves and pulleys.....	*
Miscellaneous castings.....	40 per cent

Locomotive Castings	
Driving wheel centers.....	50 per cent
Engine frames, weighing less than 1000 lb. each.....	15 per cent
Engine frames, weighing 1000-5000 lb. each.....	25 per cent
Engine frames, weighing 5000 lb. each and over.....	40 per cent
Miscellaneous locomotive castings.....	40 per cent

Marine Castings	
Propeller blades.....	10 per cent
Propeller hubs.....	45 per cent
Propeller wheels.....	net
Stern frames for merchant ships:	
In one piece.....	5 per cent
In two pieces.....	20 per cent
In over two pieces.....	25 per cent
All other marine castings.....	†

Mine and Industrial Car Castings	
Column guides, cradles, rockers and pedestals:	
In lots of 1 to 49 pieces.....	30 per cent
In lots of 50 to 99 pieces.....	35 per cent
In lots of 100 to 249 pieces.....	40 per cent
In lots of 250 to 499 pieces.....	45 per cent
In lots of 500 and over.....	50 per cent
Bumpers and link and pin drawheads:	
In lots of 1 to 49 pieces.....	40 per cent
In lots of 50 to 99 pieces.....	45 per cent
In lots of 100 to 249 pieces.....	50 per cent
In lots of 250 to 499 pieces.....	55 per cent
In lots of 500 and over.....	60 per cent
Miscellaneous castings:	
In lots of 1 to 49 pieces.....	35 per cent
In lots of 50 to 99 pieces.....	40 per cent
In lots of 100 to 249 pieces.....	45 per cent
In lots of 250 to 499 pieces.....	50 per cent
In lots of 500 and over.....	55 per cent

Other Castings	
.....	50 per cent

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.....	350

Automotive and Industrial Car Wheels Standard designs, including self-aligning type, and flanged wheels, special hubs and special flanges

In lots of 1 to 49 pieces	30 per cent
In lots of 50 to 99 pieces	35 per cent
In lots of 100 to 499 pieces	40 per cent
In lots of 500 to 999 pieces	45 per cent
In lots of 1000 and over	50 per cent
Single flange web plate wheels with plain hub	
In lots of 1 to 49 pieces	40 per cent
In lots of 50 to 99 pieces	45 per cent
In lots of 100 to 499 pieces	50 per cent
In lots of 500 to 999 pieces	55 per cent
In lots of 1000 and over	60 per cent
Single flange center wheel with plain hub	
In lots of 1 to 49 pieces	40 per cent
In lots of 50 to 99 pieces	45 per cent
In lots of 100 to 499 pieces	50 per cent
In lots of 500 to 999 pieces	55 per cent
In lots of 1000 and over	60 per cent
Effect of a 1000 ft. lift on	
Bottom plate	10 per cent
Inside of plate	0 per cent
Outside of plate	0 per cent
Pin joints	25 per cent
Roller tires	5 per cent
Scraper plates	4 per cent
Togel plates	4 per cent
Miscellaneous castings	30 per cent
Roller Castings	
Arm for roller rivet	0 per cent
Riveter frames	0 per cent
Riveter sticks	10 per cent
Miscellaneous castings	10 per cent
Road and Mining Machinery Castings	
Miscellaneous castings	30 per cent
Rolling Mill Castings	
Armature, bolt in	5 per cent
Armature boxes and plates	3 per cent
Avail block	0 per cent
First furnace castings	**
Charging box	50 per cent
Charging box heads and ends	0 per cent
Coupling boxes	0 per cent
Cylinders	30 per cent
Gears pinions, cements and trunks	*
Housings, roll and pinion	0 per cent
Mill pinions, unfinished less than 1000 lb each	20 per cent
Mill pinions, unfinished 1000-5000 lb each	30 per cent
Mill pinions, unfinished 5000 lb each and over	40 per cent
Rolls unfinished less than 1000 lb each	30 per cent
Rolls unfinished 1000-5000 lb each	40 per cent
Rolls unfinished 5000 lb each and over	50 per cent
Spindles solid	0 per cent
Spindles hollow	1 per cent
Table rollers hollow and disk	30 per cent
Worms worm wheels sprockets sheaves and pulleys	*
Miscellaneous rolling mill castings	10 per cent
Machine work pieces	†
Snow Plow Castings	
Miscellaneous castings for snow plows	
Stream Shovel Castings	
Miscellaneous castings for stream shovels	
Sugar Mill Castings	
Couplings	per cent
Crown wheels	per cent
Crusher roll	20 per cent
Gears pinions cements and trunks	*
Housings	per cent
Worms worm wheels sprockets sheaves and pulleys	*
Miscellaneous sugar mill castings	10 per cent
All Other Classes	
Other steel castings not covered above	†

*For discount on this class of work see General Conditions
 Segments and trunks
 **For discounts on this class of work see Blast Furnace Castings
 †Discounts on this class of work will be furnished on receipt of inquiry and drawings showing the castings desired
 ‡Net prices on machine work will be quoted on application

Production of Bauxite in 1921

The production of bauxite in the United States for 1921 is estimated by the U. S. Geological Survey at approximately 130,000 gross tons as compared with 321,308 tons in 1920, a decrease of 391,308 tons. This great decrease is largely the result of the curtailed demand for aluminum, particularly aluminum used in the automobile industry, though the curtailed consumption of chemicals containing alumina lessened the output of some of the mines, particularly in the Georgia-Alabama field.

After a period of inactivity extending over a month or so, the New Haven Clock Co., New Haven, Conn., has resumed operations with approximately 1500 employees. The present schedule calls for about 85 per cent of capacity. Indications are, however, the schedule will shortly be increased.

QUALITY OF THERMOCOUPLES

Effect of Small Percentage of Impurities in Platinum-Rhodium Wires

Tests made by the pyrometry laboratory of the Bureau of Standards early in 1921 revealed the fact that many of the platinum-rhodium thermocouples found on the American market were subject to large changes in indication after long continued exposure to very high temperatures.

The wires from which these thermocouples were made were obtained from two sources, one American and one British. The tests showed that the former were of satisfactory purity for the use to which such couples are applied. They satisfactorily met all industrial requirements as to constancy and reliability if properly protected by well-known methods of insulation.

The British refined metals and alloys were found to be subject to large changes in their indications after their exposure to high temperatures. Chemical and spectroscopic tests revealed the fact that the trouble was due to the presence of several tenths per cent of iron in the platinum-rhodium alloy wire. The platinum wires, on the other hand, were found to be of high and satisfactory degree of purity.

The facts developed by these tests were immediately communicated to the firms engaged in refining the metals used for thermocouples, as well as to manufacturers of pyrometers who were employing them in their pyrometric installations. As a result of these tests, the British firm determined to improve its product and immediately took up the problem of producing new platinum-rhodium alloys free from the presence of iron or other impurities. Samples of their improved wire were submitted to the Bureau for tests a few months ago, and the results show the new couples to be eminently satisfactory. Therefore, at the present time purchasers have a choice of two makes of wire, either of which will prove to be satisfactory.

This work has resulted in a marked advance in reliability of high temperature measurements, since it has brought about the general use of materials of sufficiently high purity to remove an important cause of variations in thermocouple indications.

Cobalt Magnet Steel

A new formula for making magnet steel is coming into use, the principal change from the ordinary practice being the employment in its composition of cobalt instead of tungsten, says the London *Ironmonger*. Hitherto such steel has contained about 5 1/2 per cent of tungsten, and the substitution of about 15 per cent of cobalt raises the coercive force of the material from 60 to 250, making it possible to use smaller magnets. The use of the new steel necessitates a new form of magnet, consisting merely of two small flat plates of steel placed on the sides of the armature, hence if it should come into general use the familiar horseshoe-shaped magnet will disappear. As yet, however, cobalt magnet steel is only in the experimental stage. Cobalt magnet steel costs three or four times as much as tungsten steel, but a much smaller magnet is required to do a given amount of work.

Large Portland Cement Output in 1921

Except for 1920, the 1921 production of portland cement in the United States, according to the Geological Survey, was greater than for any other year in our history. The total, reaching 98,293,000 bbl., compares with approximately 100,000,000 bbl. in 1920, and smaller quantities in preceding years. Production during the year showed a steady growth from 4,093,000 bbl. in January to more than 10,000,000 bbl. in August, September and October, falling, from seasonal causes, to 6,559,000 bbl. in December. Shipments followed a similar but much more pronounced trend leaving stock at the end of the year amounting to 21,933,000 bbl.

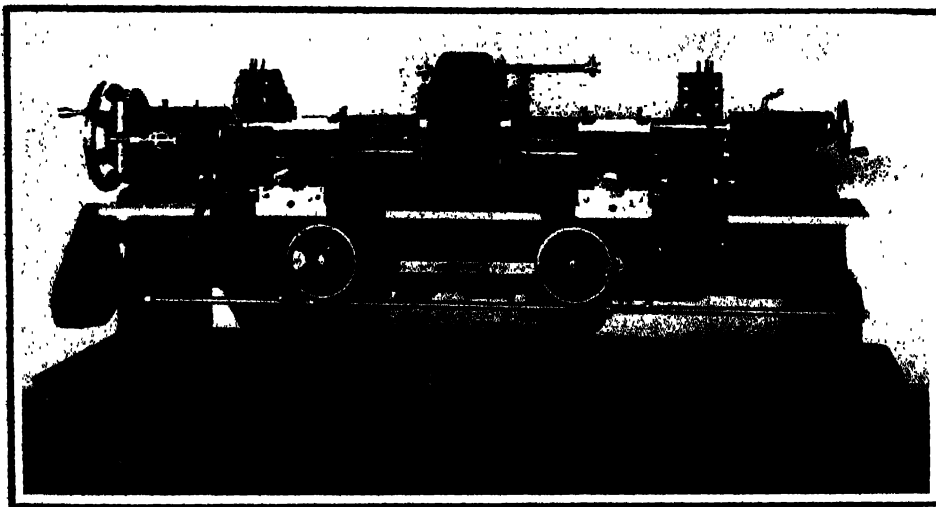
Center-Drive Lathe for Mine Car Axles

The center-drive lathe with short head, shown in the accompanying illustration, is being offered by the Reed-Pratt Co., Worcester, for turning mine-car axles and similar work. It was originally designed for turning the rear axles of small automobiles, but is said to have proved of equal value in other fields, its only limitation being that the work cannot be turned in the middle portion, as this is where it is gripped in the machine.

The head stock carries two chucks, one at each end of the spindle. These are generally of the floating type, so that they will position themselves relative to the outside diameter of the work when the jaws are tightened, at which point they are securely clamped against the shoulder on the main spindle. By this means the work is positively driven and, being held

The carriages have their bridges set off-center, permitting a close-up position to the head stock. The blocks are arranged to receive special magazine tool holders. Each carriage is provided with an automatic link motion, which by a slight effort of the operator feeds the tools into a predetermined diameter, at which point they automatically lock. The longitudinal feed of the carriages is then engaged and after turning the desired length, a tripping mechanism automatically releases the link and cam actions, which immediately allows the tools to recede from the finished work so that they will not score the work when they are returned to their starting position. Each carriage has an individual automatic feed trip, although both are driven by a single set of feed gearing at the extreme left of the machine. Both carriages feed simultaneously toward the head stock.

In the machine illustrated a back-arm attachment



Center Drive Lathe for Turning Both Ends of Mine-Car Axles and Similar Work. For long or short work, either tailstock may be unclamped and moved to proper position. The carriages have their bridges off-center, permitting a close-up position to headstock.

rigid, maintains the natural position of the shaft without deflection. The spindle is of cast iron and has a large hole through it. It rotates in cast iron journals, having a driving gear mounted directly on the spindle. In cases where the shafts are particularly short, one of the chucks is omitted, to permit the carriages to come closer to the head stock. The drive to the head stock spindle is from a $7\frac{1}{2}$ -hp. motor mounted at the rear of the bed and driving direct to the sprocket gear on the head spindle through silent chain. The motor is controlled by a foot treadle at the front of the machine which actuates a clutch, releasing the gearing in the head without stopping and starting the motor.

The left-hand tail stock has an extra large spindle with two holes running through its entire length, one of which carries a standard center, the other acting as a clearance hole through which the work is telescoped in loading and unloading the machine. By withdrawing the index plunger, which is shown at the front of the left tail stock, the spindle may be revolved, bringing the clearance hole into proper alignment with the hole in the head-stock spindle, at which position the work may be entered or withdrawn from the head stock. After the work has been passed into the head, the index plunger is released and the spindle rotated 180 deg., this bringing the center into proper position for guiding the work. The withdrawal of the index plunger is automatically actuated by the rotation of a large hand wheel, due to a certain angle of free rotation in which the cam surface on the hub of the hand wheel withdraws the plunger. By continuing to rotate the hand wheel the spindle picks up the motion and finally brings the center or clearance hole into the desired position.

There is no endwise adjustment to the left hand spindle, this being taken care of by the longitudinal action of the spindle in the right-hand tail stock, which is similar to the standard engine-lathe type. Either tail stock may be unclamped from the bed and moved to the proper position to accommodate long and short work.

has been incorporated for each carriage so that the squaring of shoulders, as well as grooving at the end of the shafts, can be performed simultaneously with the turning operation. It is not essential, however, that the machine be equipped with this arrangement. Various set-ups are possible, permitting a wide range of operations. The machine may be arranged with front blocks for diameter turning and rear blocks for shouldering and taper turning, the rear block to come into operation by hand after the diameter turning has been accomplished; or the front blocks may be used for diameter turning and the back arm for shouldering, necking, chamfering or grooving simultaneously with the turning of the front tools. In another arrangement the auxiliary blocks can be introduced at the rear, hand operated, for shaving the radius at the end of the cylindrical turning or chamfering of corners.

On a machine for turning shafts up to 2 $\frac{1}{2}$ in. in diameter and having a 9-ft. bed, the distance between centers is 72 in., and the overall dimensions 10 ft. by 40 $\frac{1}{2}$ in.

The theory of rolling mills, with recent developments in the industry, was discussed by Prof. W. Trinks of the Carnegie Institute of Technology, Pittsburgh, at a meeting of the Buffalo section of the American Society of Mechanical Engineers on the evening of Feb. 1 at the Iroquois Hotel, Buffalo.

J. D. Martin, chief engineer, Hillman Coal & Coke Co., Pittsburgh, and retiring chairman of the mining section, Engineers' Society of Western Pennsylvania, spoke on "Standardization of Mine Turnouts," at the annual meeting of the section at the William Penn Hotel, Pittsburgh, Tuesday evening, Jan. 31.

George Berry, chief chemist Halcomb Steel Co., Syracuse, N. Y., addressed the Rochester Chapter of the American Society for Steel Treating on "From Ore to Steel" at the regular January meeting, on the evening of Jan. 11.

New Heavy Engraving Machine

A heavy engraving machine, designated the No. 1-S, for cutting dies, steel stamps, large-size letters and similar work in steel, brass and cast iron, has been added to the line of the George Gorton Machine Co., Racine, Wis. The new machine is heavier and of greater capacity than the company's previous machines.

As an example of the capacity in cutting heavy lettering, a sunk letter $1\frac{1}{2}$ in. high, $\frac{1}{4}$, $\frac{5}{16}$ or $\frac{3}{8}$ in. depth of cut can be made in cast iron in 2 min. with a single cut. In cold rolled steel a letter 2 in. high, $\frac{9}{64}$ in. depth, is cut in relief in 15 min. with two cuts and in bronze a 2 in. letter, $\frac{5}{16}$ in. depth, is done in 2 min. with one cut.

The pantograph is adjustable and has a range of 1 to 1 down to 6 to 1 in reductions. The pivot bearings are ball bearing, both radial and thrust, all other pantograph bearings being formed by hardened, ground and

and is adjustable to compensate for changes in position of the pantograph.

The longitudinal feed of the table is $17\frac{1}{2}$ in. and the cross feed $8\frac{1}{4}$ in. The minimum distance from end of spindle to top of table is $\frac{1}{2}$ in., the maximum being 16 in. The belt-driven machine weighs approximately 1800 lb. and the motor driven, 1950 lb.

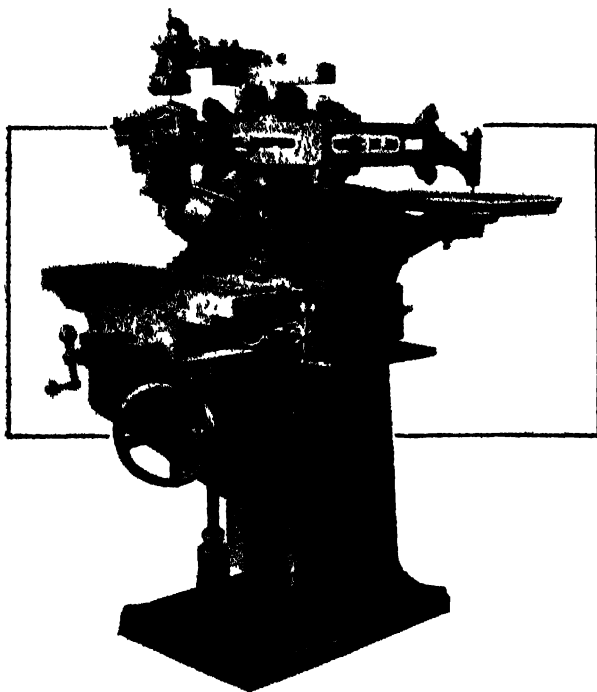
Cast Iron Carwheels Made Centrifugally

The casting of iron car wheels by the centrifugal process is reported as under way by a large British pig iron maker, which is negotiating with a British foundry for the purpose of organizing a company to develop this process, says *Foundry*. The wheels are to be made in a machine with a vertical axis and will be cast with chilled iron on the rim and a softer, more ductile metal for the center. This is regarded as likely to awaken considerable interest, as it is stated that the cast iron car wheel is practically unknown in England. The new organization is reported to have the benefit of considerable experience in centrifugal casting and it expects to produce large castings centrifugally in other lines in addition to its work in the railroad field.

New Spark Plug Gages

A new set of spark plug thread gages made to S.A.E. standard limits has been placed on the market by the Pratt & Whitney Co., Hartford. The set consists of a double-end limit plug gage of the Trilock reversible-end type, a "go" and "no go" templet in one unit and a setting plug for the templet, consisting of two threaded members and one cylindrical plug for checking root diameter.

The pitch diameters of the plugs are 0.841 in. and 0.843 in., the tolerance for tapped holes being 0.002 in.

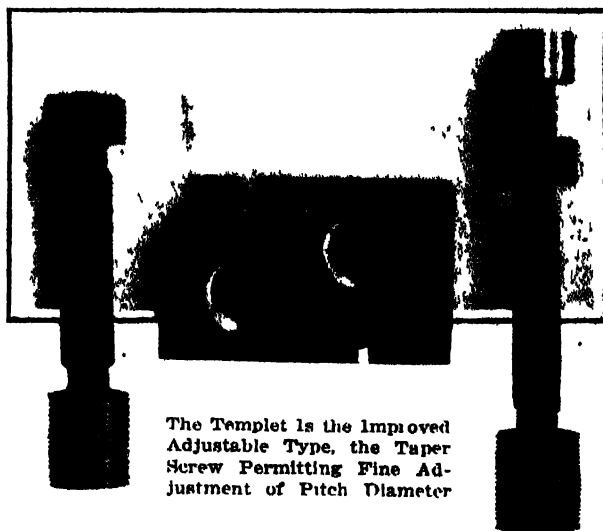


When Engraving Work of Curved or Irregular Contour a Forming Attachment Having Six Adjustments Is Used

lapped cone point centers, male and female. The tracing style is held in a $\frac{1}{4}$ -in. collet and the adjustable scales are mounted on top surfaces of bars. The scales have engraved figures, giving the settings for various reductions, and are graduated full length, 20 graduations to the inch, so that any intermediate reduction can easily be obtained. For larger work, the same machine can be equipped with a larger pantograph having reductions 2 to 1 down to 8 to 1.

The cutterhead is an integral part of the heavier of the pantograph bars. The spindle is $\frac{13}{16}$ in. diameter, is mounted on ball bearings and has a range of 1800 to 8000 r.p.m., enabling very small cutters to be used for fine work and finishing up corners. Spindle speeds down to 600 r.p.m. are obtainable by using special drive pulleys. The spindle nose has a straight hole $\frac{1}{2}$ in. in diameter with a collet nut for holding the cutters. Extra bushings to take drill rod cutters from $\frac{1}{4}$ in. diameter down can be obtained and a heavy spindle running in bronze bearings and at slower speeds can be furnished.

When engraving work of curved or irregular contour, the forming attachment having six different adjustments is used. This can be set quickly and accurately in relation to the work to be engraved. The lower member of the attachment is directly over the center of the spindle, and carries the former block, which is a hardened piece of steel of the same shape as the engraved surface, except in reverse. This controls vertical movement of spindle. The copy holder is mounted on a bracket at right-hand side of machine



The Templet Is the Improved Adjustable Type, the Taper Screw Permitting Fine Adjustment of Pitch Diameter

The templet pitch diameters are 0.836 in. and 0.839 in., giving 0.003 in. tolerance on spark-plug body threads, and a neutral zone of 0.002 in. between maximum plug and minimum hole.

The templet is shown in the accompanying illustration and is of the improved adjustable type, the taper screw permitting fine adjustment of pitch diameter. When both locking and adjusting screws are tight the threads of the adjusting screw are said to form a perfect dowel in both planes. The go and no go ends are placed close together, for convenience in spinning onto work. The go side of the templet is cut away for quick identification when using the gage for rapid inspection. The reversible plug ends are intended to provide double the usual wearing surface.

An additional open hearth furnace of the Steelton, Pa., plant of the Bethlehem Steel Co. is being fired, preparatory to the early resumption of operations. Five of the nine furnaces of the plant will then be in use.

INCORPORATION OF UNIONS

Two Reports of Private Investigators — Senator Kenyon Does Not Agree with Colleagues

WASHINGTON, Jan. 31.—Legislation making it compulsory for labor unions to incorporate is recommended in one report, and a Federal agency for regulation of the coal industry is recommended in another, made to the Senate last Friday by the Committee on Education and Labor in connection with its investigation of disorders in the West Virginia-Kentucky coal fields.

The recommendation for incorporation of unions, which frequently has been made in the past, and always vigorously combatted by the American Federation of Labor, was made in a report signed by Senators Phipps, of Colorado; Warren, of Wyoming; and Sterling, of South Dakota, all of whom are Republicans. The setting up of a code to regulate the coal industry was recommended by Senator Kenyon, of Iowa, Progressive Republican and chairman of the committee. His proposal was supported by the other three senators, but they maintained that such a code would be impracticable unless incorporation of labor unions were required so that they would be legally responsible in their dealings with the coal operators.

In his report, Senator Kenyon said that mutual concessions must be made by both operators and miners to any conflict, but the other Senators hold that the law should provide that when agreements were reached, through arbitration or otherwise, the promises made must be respected.

In their report, the three Senators said that "As a matter of fact when conditions made it safe to do so, when wages soared and when men were highly needed, these contracts were broken by the employees and there was no redress. At the same time the operators were liable for the full performance of their contracts to deliver specified quantities of coal at prices at which they had been sold."

The position of Senators Phipps, Warren and Sterling, who also differed with Senator Kenyon as to the responsibility for conditions in the West Virginia mining district, is that it should not be necessary to compel incorporation of labor organizations. Their report declared that no valid reason existed for their failure to incorporate and pointed out that such action would benefit the labor unions themselves because it would compel an accounting of funds through annual reports to all members of the organization.

It was declared, that under the present methods of handling funds of labor organizations, the great body of union men never know what becomes of the dues which they pay into the general treasury. The three Senators also said that paid organizers had gone into the West Virginia district from other States and had resorted to intimidation and violence in an effort to force unionizing the miners as a body. On the other hand, Senator Kenyon charged that both miners and operators were "measurably responsible."

Further, it was the opinion of the three Senators that "too much stress has been laid upon the point where operators were to blame and not enough is said about the crimes, including murder, of which the employees were guilty."

The proposed code to regulate the coal industry, for which Senator Kenyon announced he would introduce a bill, would create a Government coal board similar to the Railroad Labor Board. It would consist of three representatives each of the employees, employers, and the public, appointed by the President. The industrial code principles would be interpreted by the board. The proposed code is largely similar to one that has been previously outlined in a bill introduced by Senator Kenyon. Some of the high lights of the proposed bill of Senator Kenyon are: "Right of operators and miners to organize is recognized and is not to be interfered with in any manner; the right of collective bargaining through representatives of operators and miners of their own choosing is recognized; non-union miners have the right to work without being harassed by fellow workmen who may belong to unions; and union

miners have the right to work without being harassed by operators who do not believe in unionism; common laborers have the right to earn an adequate living wage; six days of eight hours each would be the recognized working standard; punitive overtime would be paid for hours worked each day in excess of the standard working day; when a dispute or controversy arises, there should be no strike or lockout, pending a conference or a hearing and determination of the facts and principles involved.

Senator Kenyon maintains that the Kansas Industrial Court idea involving compulsory arbitration, has proved futile. He considers that the topic of regulation of the coal industry and the setting up of a labor code is both timely and pressing at this period, because of the threatened strike of bituminous coal miners on April 1.

To Reduce Eye Hazard

HARRISBURG, PA., Jan. 30.—Of interest to the iron and steel trade generally are the plans of the Pennsylvania Department of Labor and Industry to remove, or decrease, the eye hazard in industry in the State. Definite steps of the year's program were announced this week by Commissioner Clifford B. Connelley, who asserted that there has been an alarming increase in the hazard in Pennsylvania and throughout the nation generally.

The Industrial Board of the department, after more than two years' of study of conditions causing eye losses, has completed a revision of safety standards governing head and eye protection in Pennsylvania. This head and eye code was recently completed and adopted by the board after one year of public hearings and revision, and is now printed for distribution. The Division of Hygiene and Engineering performed an exhaustive investigation and prepared recommendations which it submitted to the board in July, 1920, on the eye hazard.

Seven separate occupations, wherein protectors are required, are enumerated in the new code. They are:

- 1 Oxy-acetylene and other compressed gas welding and burning.
- 2 Chipping
- 3 Electric arc welding.
- 4 Grinding—wheel dressing and rough emery.
- 5 Iron tapping at cupola.
- 6 Sand and shot blasting
- 7 Thermit welding

Goggles, masks, helmets, hoods and shields are recommended as protectors for certain lines of work. In every one of the mandatory occupations, with the exception of sand and shot blasting goggles are required. In sand and shot blasting a hood is required.

Recognition of the element of negligence in the enforcement of this code has resulted in the injection of strong language for the purpose of bringing home to the workers and employers the danger in eye accidents. The fact that eye cases number more than all other permanent injuries combined, for which compensation is paid, brings home a lesson to the responsible parties, Commissioner Connelley emphasized. Another lesson which confronts the workers particularly is found in the fact that eye losses are permanent in the sense that such cases almost preclude rehabilitation in any form.

Safety Movement at Youngstown

The Youngstown Sheet & Tube Co., Youngstown, Ohio, is instituting a safety drive at its various plants in order to reduce the number of accidents in 1922. A special appeal has been issued to the newly elected representatives of employees in the Representation Plan to aid the movement, that the record for 1922 will be the best ever.

Pointing out the cost of accidents to the company, James M. Woltz, general safety director, states that "when an employee is injured and required to be off work, the company loses an experienced workman. A man with less experience takes that job and we have a reduction in production on this particular machine. The quality of the work is not as good; the slowing

down of initial production may, and oftentimes does, cause a slowing down all along the line to the finished product, and sometimes even to the shipping.

"The work of the medical department, compensation department, safety department and other correlated departments or bureaus is increased, and this means spending additional money.

"A new man is taken into our organization to replace the man who was injured. It costs money (from \$35 to \$500 is the estimate, depending upon the work, etc.) to hire, examine, instruct and supervise this new man, and there is a lot of his product at first that is only good for scrap, and this is a heavy loss. His output is limited and not up to the standard."

Labor Conditions at St. Louis

ST. LOUIS, Jan. 31.—The labor situation in the Eighth Federal Reserve District is reflected in a statement compiled by the Federal Reserve Bank of the district from reports received from 210 leading employers in 21 of the largest cities of the district showing that the number of employees of the reporting interests decreased 8887 or 5.1 per cent (men decreased 8.3 per cent while women increased 35.4 per cent) between Dec. 31, 1920, and Dec. 31, 1921. On Dec. 31, 1920, the number was 10.9 per cent under normal and on Nov. 30, 1920, the total was 11.8 per cent under normal. Wages, figured on a semi-monthly basis, decreased \$3,025,452.32 or 20.7 per cent between Dec. 31, 1920, and Dec. 31, 1921.

On July 1, 1921, the total wage earners was 27.4 per cent under normal, on Aug. 1, 1921, 23.1 per cent under normal, on Sept. 1, 1921, 16.4 per cent under normal, on Oct. 1, 1921, 17.7 per cent under normal, and on Nov. 1, 1921, 17.1 per cent under normal.

Newport Rolling Mill Co. Reincorporates

The Newport Rolling Mill Co., Newport, Ky., has decided to surrender its Kentucky charter and to reincorporate under the laws of the State of Delaware. This move is being made for the purpose of making the company an interstate corporation, giving it an opportunity to seek redress in United States courts if any person or persons interfere with the conduct of its affairs. The decision of the company was made as a result of the strike now in progress at its plant, and the difficulty encountered by the company in securing adequate protection for its employees. The Kentucky State troops which have been stationed at the plant for the past five weeks, were moved away on Jan. 28, and Newport city officials were commissioned to maintain order at the plant. There have been several instances of employees being attacked even when the troops were on guard, and fears are entertained that civic officials may not be able to control the situation.

Working Rules Rejected

CHICAGO, Jan. 28.—Rejection of the new rules covering working conditions in railroad shops recently announced by the United States Railroad Labor Board, has been ordered by a committee of 100 acting for the six railroad shop crafts. In a circular issued to the shop men in this country, the committee has ordered new disputes instituted with the railroad management immediately to the end that the rules again be amended and, failing to reach an agreement, the disputes are ordered taken to the Labor Board for hearing. The circular is signed by the international presidents of the six shop crafts unions.

The General Electric Co., West Lynn, Mass., is employing 7500 to 8000, as against a normal personnel of 11,000 to 12,000. Incoming business shows a slight improvement, and the outlook is brighter than it has been before in some time.

Eight hundred employees of the Readville car shops, New York, New Haven & Hartford Railroad, Readville, Mass., laid off a month ago, have been called back to work without change in wages. Returning employees include machinists and blacksmiths.

REFRACTORIES LITTLE CHANGED

Demand Comes From Many Industries But Is Limited in Volume

PITTSBURGH, Jan. 30.—The situation in refractories does not change much. Demand is anything but brisk, and yet there is some buying by practically all consuming industries, and to be doing some business at a time when the iron and steel industry, the chief outlet for refractories, is running at such a moderate rate as at present, is an occasion for some satisfaction. This feeling, however, does not extend beyond the fairly diversified character of the buying, for prices generally either show a loss or mean only a new dollar for an old one. An effort is being made to maintain present prices, chiefly on the argument that they are as low as they should be on the basis of current costs. This plea, however, does not carry much weight with the iron and steel producers, whose experience for some time has been that what buyers are willing to pay rather than producing costs determines the selling prices.

Large makers of fireclay brick are holding high duty grade at \$32 per 1000 as a minimum, but instances still are heard of business being accepted by smaller producers at \$30 in all districts, except possibly Kentucky. There does not seem to be any shading of the recently established minimum of \$30 per 1000 for Pennsylvania silica brick, but there is scarcely enough business to provide a real test of that figure, and in the Chicago district the going price is not more than \$35.

An interesting development in connection with magnesite brick prices is that since Eastern makers now are entirely on Austrian magnesite, the prices of the larger producing interests are f.o.b. Baltimore, that port having been set up as a basing point. The freight from Baltimore to Pittsburgh common freight points is \$4.70 per net ton and to Youngstown district points \$5.60. Chrome brick still is weak, with most sales at or near \$41 per net ton, f.o.b. works.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	\$32.00 to \$35.00	\$30.00 to \$32.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick:		
Pennsylvania		30.00
Chicago		35.00 to 37.00
Birmingham		40.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore)		53.00
Chrome Brick:		
Standard size, per net ton		41.00 to 43.00

Building 2 1/4 Years Behind Demand

Col. Leonard P. Ayres, vice-president Cleveland Trust Co. and formerly chief statistical officer of the A. E. F., speaking at the annual convention of the Associated General Contractors of America, in Cleveland, last week, expressed the belief that prices will continue to fall, intermittently, for ten or twenty years more, but conveyed assurance that the construction industry will be immune to many of the embarrassments of the coming period, because it supplies a market in which there is a latent demand equal to 2 1/4 years of normal production of buildings.

"In other words," said Col. Ayres, "construction can go along for nine years at 25 per cent above normal, and only fill the normal demand by the end of that time."

The Ajax Electrothermic Corporation, Trenton, N. J., has sold to the U. S. Molybdenum Metals, Ltd., Los Angeles, Cal., a high-frequency converter of 25 k.v.a. capacity, together with three Ajax-Northrup high-frequency induction furnaces. They are to be used for the reduction of molybdeniferous, tantaliferous and tungstic ores at the mines. The company has also sold to the Welsbach Co., Gloucester, N. J., a 25-k.v.a. Ajax-Northrup high-frequency converter and a special furnace for attaining a temperature of about 1600 deg. C. (2912 deg. Fahr.).

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ESTABLISHED 1855

THE IRON AGE

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Heaping Up Labor Antagonism

At Washington the other day Samuel Gompers warned the members of the Agricultural conference that those of them who favored the repeal of the Adamson law were playing into the hands of the bankers, implement manufacturers and their like. He said that he had "faced the same stereotyped antagonism to labor" in the Unemployment conference last fall. While the Agricultural conference did not vote for the repeal of the Adamson law, it did call for participation by railroad labor and railroad corporations in the general price deflation now under way. Mr. Gompers was not pleased with this position respecting railroad labor. His attitude on all proposals for wage reductions is what it was just after the war, when he served notice that organized labor was going to hold everything that it had gained in war time. Of course, organized labor has not been able to hold wages up to the war level, and all the king's horses and all the king's men could not avert the deflation that has been under way. It is not the advocates of necessary wage reductions who are working against labor, but those leaders who insist on keeping wages so high that factories cannot run, since the market will not pay their price.

As has been said over and over, it is not the holding of a high wage rate the worker wants, so much as the maintenance of his purchasing power at the highest possible point. What will it profit a man in the common labor category to have a \$5 daily wage rate and get but one or two days' work a week? It is the amount in the pay envelope that counts, and what it will buy. The coal miners, who share Mr. Gompers's unwisdom, think the remedy for their small weekly earnings is to raise the rate still higher. It is perfectly plain to the average intelligence that excessive wage rates are responsible for very much of the inactivity at industrial plants in the United States, high railroad labor being responsible more than anything else. The farmers have had deflation in excess. High transportation rates have done them more hurt than any other one thing. Naturally they ask to have transportation rates reduced and they recognize that this must come about through a reduction of railroad wages.

Mr. Gompers's sulphurous language is familiar, but we can only wonder that he goes on year after year discussing labor and economic questions as though all who disagreed with him were enemies. He never gets over the language of militarism. To the farmers at Washington he said that if they adopted the report of the committee which recommended the repeal of the Adamson law, "we cannot help but feel you are aligning yourselves with our enemies." We could understand such language if it came from an advocate of the abolition of the "capitalistic system" root and branch. But Mr. Gompers has been a stout opponent of the soviet and all that ilk. Yet he has steadily urged the essential antagonism of employer and employee and opposed any plan that would bring about direct contacts between employers and their employees in friendly conference. Nothing has been more heartening to the friends of better industrial relations than the progress made in recent years with plans of employee representation that have aimed at the settlement of disputes on a basis of fairness and justice rather than by the argument of superior force. In all these the aim has been to bring into industrial relations the spirit of the international conference that is now so successfully ending its labors at Washington.

To the carrying over into industry of any such program of peace and conciliation the American Federation of Labor is opposed with all its might. The greatest military machine in the labor world was built for war and its perpetuation requires a continuing state of war and the constant preaching of enmity and antagonism.

The low rate of American blast furnace operation in 1921 naturally has been reflected in the iron ore imports. To Dec. 1, 1921, these had fallen to the lowest figure in many years, or 28,510 gross tons per month against 216,231 tons per month in 1913. A feature of last year's imports was the large proportion from Sweden. To Dec. 1, 42 per cent of the total imports, or 11,894 tons per month, came from Sweden, as against only about 14 per cent in 1913, when the volume both from Sweden and other countries was much larger.

Spain's proportion fell to very small figures last year. There is no doubt, however, that imports from Sweden and other countries will expand rapidly as blast furnace operations increase, because foreign ore can be laid down along the seaboard at a lower cost than Lake Superior ores, and compete in quality as well.

More Steel in 1922 Than in 1921

It is a common expectation that steel production in 1922 will exceed that of 1921. The history of reactions in the industry is one of rebound in the year following a low dip. If one takes for study the half century 1864 to 1913 inclusive he cuts out the recent war but takes into the reckoning the Civil War boom in production, with the recession that would follow if war necessarily involves a recession afterward. In those 50 years there were 31 which made new high records in pig iron production and only 19 that failed to do so. Thus the proportion of record-breakers was better than six in ten. The longest spell without a new record was five years, 1874 to 1878, the next longest being the four years 1891 to 1894, next coming the three years 1883 to 1885.

The greatest recessions in pig iron production were in 1876 and in 1894, when output was 27 per cent below the previous high mark for a year, and in 1908, when there was a recession of 38 per cent. In 1921, on the other hand, the recession was 58 per cent from the record of 1916. In the year after 1876 there was a gain of 11 per cent, while after 1894 there was a gain of 42 per cent and the making of a new record and after 1908 there was a gain of 55 per cent and a new record.

This is speaking merely by the statistics. The years 1876 and 1894 had practically nothing in common with 1908 from the economic viewpoint. They were years of industrial depression in which demand for iron and steel increased despite the depression, while 1908 was simply a year in which the country liquidated its stocks and made a fresh start, for 1909 broke the previous production record by a small margin, and then 1910 beat 1909 by 6 per cent.

One can argue that there should be a much greater demand upon the iron and steel industry this year than last without contending that history must repeat itself in full, without refusing to admit that the war must exert an important influence. Pig iron could gain 54 per cent over 1921 and still have 54 per cent to go above that tonnage to equal the previous record, while steel ingots could gain one-half and still have to gain one-half of that to equal the war-time record of output.

Merely a duplication in 1922 of the actual ultimate consumption of 1921 would require an increased production at mills and furnaces, for there is no denying that stocks of steel in the hands of buyers and stocks of manufactured goods in the hands of various holders were much smaller at the end of 1921 than at the beginning. That is not because stocks at the beginning of 1921 were phenomenally large, but because stocks at the end of the year were practically nothing. The same consumption this year as last would mean

larger production, restoration of normal stocks would mean still larger production, and a moderate increase in consumption would mean additional production on top of that.

So great was the slump in steel production in 1921 that one can throw out of the reckoning the war production and take it that a steel production in 1922 of 25 per cent less than production in 1912 and 1913 would still be 16 per cent more than production in 1921, thus allowing for a recession of 25 per cent in consumption in ten years instead of counting upon any increase at all. Thus the most moderate—even pessimistic—appraisal of prospects must show that the iron and steel industry has left its worst year behind.

Volume of Steel-Using Business

The great difference between the volume of general business in the United States and the character of the business, from the standpoint of steel manufacturers, needs always to be borne in mind. What the steel industry is actually thinking of, when it speaks of the volume of general business, is not really general business at all, but rather the particular kind of business that makes for steel demand, the kind of business that represents construction, expansion and improvement.

As to the actual amount of business done, the business that involves a money turnover, there is no better index than the "bank debits" reported by the Federal Reserve Board. These represent the total of debits to individual accounts at banks in about 150 leading clearing house centers. The figures are better than statistics of clearing house operations for various reasons, one being that they include checks deposited at the banks on which they are drawn. These bank debits are reported weekly, and are now available in monthly totals for the past three years, as follows:

Bank Debits Millions of Dollars			
	1919	1920	1921
January	34,138	44,737	37,560
February	27,883	35,281	29,368
March	31,725	42,835	33,487
April	32,270	41,056	31,812
May	36,555	38,695	32,110
June	38,676	39,778	33,172
July	40,190	39,299	31,088
August	37,458	35,783	29,179
September	38,089	36,862	31,225
October	43,880	40,207	33,853
November	41,969	39,265	32,997
December	43,916	42,400	37,542
Year	449,349	476,188	393,923

There are represented in these bank debits nearly all business, commercial and industrial transactions, including sales of real estate, sales of commodities at wholesale and retail, services rendered for salary or wages, bond and stock transfers, interest and dividends paid, etc.

Comparing the year totals, 1920 is only 6 per cent above 1919 and only 21 per cent above 1921. In some minds the reaction to this showing may be simply that here are some statistics that need to be explained away, but it is more practical to recognize the value of these statistics and form a viewpoint in accordance with them.

The Bureau of Labor's index number of com-

modity prices at wholesale was higher for 1920 than for 1919 by 15 per cent, and higher for 1920 than for 1921 by 57 per cent. Wages and salaries were higher in 1920 than in 1919 and much higher than in 1921. Payments to and by the railroads were higher in 1920. Dividend disbursements were much higher. Practically all the important things that can be reckoned in dollars in proportion to the physical volume of business done or service rendered were higher in 1920 than in 1919 or 1921 by greater margins than are shown by the bank debits. The conclusion is that the physical volume of business was less in 1920 than in 1919 and probably less than in 1921.

This fact is not something to be explained away but something to be used to enable one to obtain a clearer viewpoint. From the steel maker's standpoint it is not so much a question of how much money is changing hands, how much "business" of a sort is being done, but whether the business or activity is of the nature to produce steel demand. The activity of 1920 produced a large steel demand, yet there must have been involved a relatively light turnover of some commodities that were very high priced and were assumed, merely on that account, to be in large demand. Some of these commodities were held at high prices in 1920 and did not sell, while in 1921 they were offered at lower prices and did sell. The country did not stand still in 1921, but transacted a great deal of business, of a sort, and while it called for little steel during the year it probably wore out a great deal of steel in its activity, and it has been going at an ever increasing pace since last August, auguring an eventual increase in the demand for steel.

Trade Information for All

At a recent meeting of members of the National Conference of Business Paper Editors and representatives of the Chamber of Commerce of the United States in Washington, the decision of the Supreme Court in the so-called Hardwood Lumber case was discussed at length. The prevailing opinion was in harmony with that expressed in these columns shortly after the decision was handed down, especially as to the ability of trade organizations to carry on statistical work, when it is not in any way intended to use it to boost prices, and also in the opinion that it will now be necessary to depend, to a greater extent than ever, upon trade paper publications.

In the case of the Hardwood Manufacturers' Association, the statistics as to prices and production, in the opinion of the court, were used to establish higher prices and to monopolize the market. The statistics were not sent to buyers and sellers but only to members of the association. If, however, the information as to prices and production is made open to all, as in the case of publication in trade papers, it is difficult to see how there could be any more objection to it than to the market reports already published.

There has been some disappointment because the much-talked-of statement in regard to the situation created by the Supreme Court decision has not been issued by the Department of Justice. It

has been an open secret, however, that Cabinet officials were not unanimous in their views as to the decision. Moreover, the Attorney-General, perhaps naturally, hesitated about issuing an explanation of the Supreme Court decision. Pronouncements of the highest court in the land are supposed to speak for themselves, and the Attorney-General is not expected, ordinarily, to attempt to clarify the language. If, however, agreement could be reached and a statement issued removing some of the uncertainty that now troubles many associations which do not know whether they are acting legally or not, it would be well for all concerned.

A Contrast in Steel Exports

The recent changes in the positions of the leading countries in respect to steel exports are worth noting. Data for the last half of 1921 show that countries which were in the front rank in 1920 have been passed by others from which not so much was expected. The following table compares the last half of 1921 with other years, the figures representing monthly averages in tons:

	Last Half of 1921	1920	1919	1913
Germany	225,584*	115,883	10,300	479,800
Great Britain	144,192*	271,000	186,106	414,100
France	127,100†	71,600	19,400	48,200
United States	103,467	392,400	362,100	241,000

*December estimated.

†Third quarter only.

From a position of leadership in 1920, the United States has dropped to the foot of the list, with only 27 per cent of its 1920 exports and less than 45 per cent of the 1913 movement. Germany has advanced to first place, showing a striking recovery in two years. In the last two or three months of 1921 Germany's exports were about 50 per cent of those for 1913. Great Britain is rapidly regaining her overseas trade, while France has taken a position by no means insignificant.

The export position of the United States may not be better than third in the list in 1922. High transportation and high fuel costs are retarding factors at home, and adverse exchange will be a continuing influence. In Great Britain liquidation in prices and labor has been more rapid recently. France and Germany are hard at work and labor and materials are cheap. Germany's disarmament will work steadily in her favor, as will every step toward stability in eastern Europe, where much German steel at length will come into use. The Orient, South America, South Africa and Australia will be the chief outlets for American steel, apart from the steady stream flowing in upon our neighbor on the north.

In a plant of the Detroit Edison Co. has just been completed the largest boiler in the world. It is rated at 2982 hp., and can convert each hour 24,000 gal. of water into 200,000 lb. of steam. The boiler was made by the D. Connelly Co., Cleveland. The four upper drums are 44 in. diameter and the two mud drums 48 in.; there are 2184 tubes. The combustion chamber volume, from the tubes to the top of the stoker tuyeres, is 11,440 cu. ft. The stoker, of the Taylor three-plunger type, with 14 retorts on each side of the boiler, has a total fuel-burning capacity of 33,600 to 39,200 lb. of coal per hour.

CORRESPONDENCE

Tests of Rotary Drill Pipe

To the Editor: In THE IRON AGE of Sept. 29, 1921, there was an article on "Tests of Rotary Drill Pipe" which I had written with the object of calling attention to the fact that nearly all of the specimens failed in tension by jumping out of the coupling rather than by breaking the pipe. For the sake of brevity, a full description of the tests was omitted and emphasis was placed on the manner of failure. It seems, however, that the apparent lack of uniformity of the maximum load in these published results for iron pipe has led to considerable adverse criticism of iron pipe for oil well use. The purpose of these tests of casings was to determine the strength or efficiency of the joint under particular threading conditions or with predetermined looseness of the joint in screwing up. In order that no injustice be done this industry, I am asking that you publish the following more detailed table of the results of these tests:

Results of Tensile Tests of Oil Well Casings
(First eight items are iron pipe; last item, steel.)

Diam. In.	Weight Per Ft. Lb.	Threads Per In.	Thread Leaving in Coupling, In.	Tightness of Joint	Max. Load, Lb.
5 7/8	17	11 1/2	2	Mild tight	168,400*
5 7/8	17	11 1/2	1 1/2	Mild tight	153,400*
5 7/8	17	11 1/2	1	2 thds. loose	137,760*
5 7/8	17	11 1/2	3/4	4 thds. loose	126,000*
10	40	10	1 1/2	Mild tight	314,000*
10	40	10	1	2 thds. loose	217,300*
10	40	10	3/4	3 1/2 thds. loose	191,000*
10	40	10	1/2	Mild tight	265,860*
10	40	10	3/8	Mild tight	337,800†

*Coupling pulled off the pipe.
†Pipe broke just within the lower coupling.

A. H. STANG,

Associate physicist, Bureau of Standards,
Pittsburgh Branch, Department of Commerce.

Steel Corporation New Construction

The statement has been published recently in various quarters that the National Tube Co. would build an extensive plant at Gary, Ind. This is not a new project. The United States Steel Corporation announced some years ago that its tube subsidiary would build a complete plant, including blast furnaces, at Gary. From 1917 to 1920, at the beginning of each year, in connection with the Steel Corporation's program of new construction, the following item appeared: "Gary Tube Plant—Self-contained tube plant, including four blast furnaces." The statement of Jan. 1, 1920, was the last in which this item had a place. It has been the understanding, however, that the Steel Corporation has not given up the project. The announcement that it has again become active would not be surprising, as there has been no record of the abandonment of any new construction project the Corporation has once announced.

The Steel Corporation's statement of new construction under way at the beginning of 1922 included a reference to the rod and wire mills and town site extensions, with additional dwellings for employees, at the Duluth works of the Minnesota Steel Co. Work on the rod and wire mills has been actively carried on for some time, and it is probable that these will be put in operation in May.

The Maryland Steel Rolling Co., 1410 Fidelity Building, Baltimore, will commence work immediately on a new plant at Chesapeake and Cleveland Avenues, St. Helena, near Baltimore, manufacturer of steel reinforcing bars and kindred products. The initial building will be 66 x 228 ft., and will be supplemented by other one-story work buildings. The machinery installation will include a traveling crane, and different equipment contracts are being let. R. S. Baldwin is general manager.

STEEL CORPORATION EARNINGS

Deficit Again Recorded — Very Poor Showing Made in December

The net earnings of the United States Steel Corporation for the last quarter of 1921 were \$19,612,033 compared with \$18,918,058 in the third quarter. The corporation earned the preferred dividend, but not the common, and it was necessary to take \$5,280,901 from the surplus. The poor record for the past two quarters is still considerably better than that for the last quarter of 1914 when the earnings were only \$10,933,174, the lowest on record. The usual dividend of 1% on preferred and 1 1/4% on common were declared. For the year the total net earnings were only \$92,708,827. The deficit for the year is \$14,001,178 after paying dividends. The earnings for the past four years were as follows:

Quarters	1921	1920	1919	1918
First	\$32,286,722	\$42,089,019	\$33,513,384	\$56,961,424
Second	21,892,016	13,155,795	31,331,301	62,557,391
Third	18,918,058	18,051,546	40,177,232	42,861,589
Fourth	19,612,033	13,477,862	35,791,302	36,834,165

Net earnings each year \$92,708,827 \$177,174,126 \$143,813,219 \$198,834,569

Earnings

The statement for the quarter ending Dec. 31 shows steady decrease in earnings from October to December. It is as follows:

	Earnings Before Charging Interest on the Subsidiary Companies'	Less: Interest on the Subsidiary Companies'	Balance of Earnings
October, 1921	\$8,861,873	\$660,515	\$8,204,358
November, 1921	7,100,727	660,289	6,440,438
December, 1921	5,633,621	666,284	4,967,337
	\$21,599,121	\$1,987,088	\$19,612,033
Net earnings			\$19,612,033
Less charges and allowances for depreciation and sinking funds on U. S. Steel Corporation bonds			8,290,021
Net income			\$11,322,012
Product interest for the quarter on U. S. Steel Corporation bonds outstanding		\$4,878,304	
Premium on bonds redeemed		117,462	
			5,025,766
Balance			\$6,296,246
Add, net balance of sundry charges and receipts			1,081,555
Total			\$7,377,801
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1 3/4 per cent.		\$6,304,020	
Common, 1 1/4 per cent.		6,353,782	
			12,658,702
Deficit			\$5,280,901

C. A. Orr Appointed Receiver of Cromwell Steel Co.

The Cromwell Steel Co., Cleveland, with a plant at Lorain, Ohio, has been placed in the hands of a receiver on the petition of the Guardian Savings & Trust Co., Cleveland. C. A. Orr, vice-president and general manager of the steel company, was named as the receiver. His office is at 1539 Guardian Building. The obligations of the Cromwell company include \$2,000,000 in bonds on which interest has been defaulted and approximately \$1,000,000 in notes and accounts. About \$1,250,000 in bonds, stocks and other claims have been deposited with the Guardian Bank under the terms of a recent adjustment agreement.

The plants of the New London Ship & Engine Co., at New London, Conn., are starting up again, having received a good sized order recently which will keep a part of the plant in work for over a year. Additional men are added to the force each week.

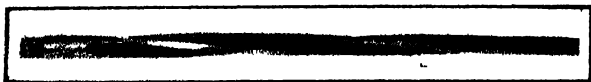
Work has been started on the Ford electric plant at Flat Rock, Mich., below Detroit. The contractors have started blasting out a spillway 5 ft. deep and one-half mile long at the bottom of the Huron River bed.

Taper Pin Reamer,

A line of taper pin reamers under the name of Cutwell has been placed on the market by the Bickford-Switzer Co., Greenfield, Mass. The reamer has three right-hand spiral flutes, the cutting lands are rugged and the hook or undercut generous.

The reamer is sharpened so that two of the lands are relieved up to the cutting edge. The third land is relieved for only about two-thirds of its width, the balance being a circular section which acts to steady the tool and prevent the right-hand spiral and undercut from drawing the tool into the work.

It is claimed that this reamer will not grab or draw into the work, that it cannot chatter and that it cuts like a drill and works best when used by power. The

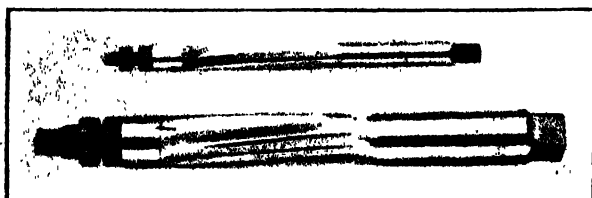


New Taper Pin Reamer

same design has been applied to a chucking or hand reamer for parallel holes. In this case there are three equally spaced and fully relieved cutting lands, and midway between two of these there is a narrow and unrelieved land which acts to steady the tool and prevent its being drawn into the hole or chattering. It also serves, in connection with one of the cutting edges, to furnish a place to measure the diameter of the reamer.

Spiral Fluted Expansion Reamer

The Pratt & Whitney Co., Hartford, has added to its line of small tools the spiral-fluted expansion hand reamer shown in the accompanying illustration. The long life of this type of reamer and the adjustable feature that permits covering a range of sizes with one



The Lock Nut Holds the Size and the Safety Stop Prevents Over Expansion

tool are features emphasized. Oversize and undersize holes can be reamed by simple adjustments.

The reamers are made in all the regular sizes. They are equipped with a lock nut to hold the size and a safety stop to prevent over expansion and indicate positively when the maximum limit has been reached.

Bids on Government Shells

CHICAGO, Jan. 31.—Bids were taken by the Government here to day on 31,000 tons of shells located at Savanna, Ill.; Columbus, Ohio, and Toledo. Successful bids were as follows: \$11.01 per gross ton f. o. b. Savanna, submitted by the Continental Iron & Steel Co., Chicago and New York; \$13.50 per gross ton f. o. b. Columbus by the Buckeye Steel Castings Co.; \$12.26 per gross ton f. o. b. Toledo, by the Hynnan-Michaels Co., Chicago.

The General Electric Co. has developed what is known as an open phase and phase reversal relay designed to prevent polyphase motors from running when a phase of the power circuit opens or reverses, with consequent burnouts or damage to the driven machinery.

A Youngstown district steel interest has purchased upwards of 1,000 tons of heavy melting scrap at \$15.50.

OPPOSE PITTSBURGH BASE

Witnesses Continue Testimony as to Damage But Admit Companies Prosper

MILWAUKEE, Wis., Jan. 31.—Witnesses examined in the basing point case being heard by the Federal Trade Commission Tuesday expressed the opinion that the concerns they represent suffer considerable damage through their inability to compete with rolled steel fabricators in the territory east of Chicago because of the addition of the freight rate from Pittsburgh to Milwaukee on shipments of material, wherever the point of delivery origin. Julius P. Heil, vice-president of the Heil Co., testified that frequently he purchased bars from the Bay View mill of the Illinois Steel Co. at Milwaukee, and called for the material with his own trucks, but was charged freight rate from Pittsburgh to Milwaukee. Mr. Heil said with one exception every quotation made him by the Steel Corporation member companies was based on Pittsburgh plus. On May 18, 1920, he said there was an exception to the rule when the Illinois Steel Co. quoted prices on 405 tons of bars and structurals, f.o.b. Milwaukee. Within the week, he said, all concerns save Inland Steel Co. quoted f.o.b. Pittsburgh, Inland quoting for Indiana Harbor. These affected blue annealed sheets, plates, bars and angles.

On Jan. 25, Mr. Heil said, the Wisconsin Steel Co., Chicago, quoted bars and angles at \$1.60, f.o.b. Milwaukee, while the Illinois Steel Co. quoted \$1.50, f.o.b. Pittsburgh, or practically \$1.5c. per hundred more than the Wisconsin Steel Co.

J. B. Wheeler, purchasing agent Federal Bridge & Structural Co., Waukesha, was the first witness Tuesday morning, giving testimony involving purchase orders and invoices referred to Monday by President C. J. McIntosh. Henry F. Millmann, purchasing agent Geuder, Paeschke & Frey Co., galvanized utensils, testified it was necessary to absorb freight in selling in Eastern as well as far Western territory in order to compete with Eastern competitors, because of Pittsburgh plus. He said a competitor in Wheeling could sell anywhere in the United States in competition with the Milwaukee company on a cost parity or even an advantage over that, excepting only in Milwaukee, and here the advantage to Geuder, Paeschke & Frey Co. amounts to only 2c. per 100 lb.

On cross examination by the Steel Corporation counsel, witnesses invariably admitted that their concerns had flourished and prospered despite the handicap of Pittsburgh plus, but insisted this system hampered them in expanding trade in competition with Eastern manufacturers. These statements usually were ruled out as speculative statements, however.

(Report of Monday's proceedings will be found on page 361.)

The National Association of Waste Material Dealers, Inc., Times Building, New York, has inaugurated a membership drive for the month of February. Out of a quota of 65 members to be secured throughout the United States an allotment of 10 has been made for New York and vicinity. The secretary of the association is Charles M. Haskins.

The February meeting of the Pittsburgh Chapter of the American Society for Steel Treating on Tuesday evening, Feb. 7, at the Chatham Hotel is designated as a "shop-kink" meeting, at which several speakers will introduce problems for solution which are expected to result in bringing out valuable information.

A meeting will be held in St. Louis, Feb. 21 to 24, inclusive, of the managers of the 37 Better Business Bureaus now operating in 37 of the larger cities of the country. The meeting will devote itself largely to the truth movement in advertising.

Hearing on Basing Point Case Begins

Examiner of Federal Trade Commission Takes Testimony at Milwaukee—Admitted That Conditions Are Temporarily Improved

MILWAUKEE, Jan. 30.—The Pittsburgh basing point practice and its alleged discriminatory effect on Western rolled steel consumers was discussed in testimony taken by the Federal Trade Commission in a hearing which opened here to-day. J. W. Bennett, examiner of the commission, presided on the first day of the hearing, which is expected to continue in session during the remainder of the week. Houston Thompson, member of the commission, was expected to arrive on the scene by Tuesday. Following adjournment in Milwaukee, hearings will be held at Minneapolis, Chicago, and other cities. The testimony is being taken in connection with the complaint issued by the commission against the United States Steel Corporation and its subsidiaries for alleged unfair methods of competition in interstate commerce and discrimination in price between purchasers of its products. Acting as counsel for the commission is K. E. Steinhauer, assisted by E. W. Burr and J. A. Simpson. Others present interested in the prosecution of the case are H. G. Pickering, attorney Western Association of Rolled Steel Consumers, and C. L. Hilton, Attorney General, State of Minnesota, and Ralph M. Hoyt, Deputy Attorney General of Wisconsin, who appeared as a result of resolutions passed by their respective legislatures condemning the "Pittsburgh Plus" practice. C. A. Severance, president the American Bar Association, and W. W. Corlett, general solicitor United States Steel Corporation, represented the respondents.

The witnesses who were examined and cross-examined on Monday included Charles A. McIntosh, president Federal Bridge & Structural Co., Waukesha, Wis., H. W. Ladish, president Ladish Drop Forge Co., Cudahy, Wis., and H. E. White, traffic expert Western Association of Rolled Steel Consumers.

Chicago and Pittsburgh on Parity

Mr. McIntosh testified that his company was engaged in the business of fabricating steel bridges and buildings, with a normal annual capacity of 10,000 to 12,000 tons of steel. He stated that the chief raw materials he used, namely steel plates, structural shapes, and bars, were bought f.o.b. Waukesha, at prices which, until six or eight months ago, were equivalent to the market prices f.o.b. Pittsburgh plus the freight to Waukesha. Of late, however, his company has been purchasing these products at prices which are equivalent to the market price f.o.b. Chicago plus the freight from that city to his plant. The Chicago base prices, he said, are substantially on a parity with the Pittsburgh base prices quoted by Eastern mills. In normal years, he said, the prices quoted by all mills were substantially the same, and he averred that the present existence of a Chicago base was temporary and due to the depressed condition of the market. Under cross-questioning by Mr. Severance, Mr. McIntosh asserted that he did not regard any of the past three years as normal, a pronounced sellers' market having been succeeded by a sharp drop in demand. He stated that with the appearance of a Chicago base his company had competed for business in territory east of his plant, a territory from which it was shut out when the Pittsburgh plus practice was in vogue. He pointed out that while Pittsburgh base prices restricted the operations of his company to the territory west of its plant, Eastern fabricators had no such handicaps, but could bid for work on even terms with competitors not only in the East but in the Western States. Mr. McIntosh admitted that there are numerous fabricating companies in the territory ordinarily served by the Federal Bridge

& Structural Co. and that all of them had developed their business when the Pittsburgh plus practice was in effect.

Western Fabricators Shut Out

Mr. McIntosh was followed on the stand by Mr. White, whose testimony was offered to show why the Pittsburgh basing point shut Western fabricators out of the markets east of them. The rates on finished steel products such as fabricated steel tanks, machinery, boilers, forgings, etc., he said, were substantially the same as those on the rolled steel. The rate on structural steel, fabricated or unfabricated, from Pittsburgh to Muskegon, Mich., is 39.5c., whereas the rate from Waukesha to that destination is 30.5c. Assuming that both the Waukesha fabricator and his Pittsburgh competitor pay the same price, f.o.b. Pittsburgh, the former is under a handicap of 32.5c. per 100 lb., as he must pay the rate from Pittsburgh of 41.50c. plus the rate of 30.5c. to Muskegon. Mr. White cited numerous other examples of a similar character.

Temporary Conditions

The second steel consumer to be examined was H. W. Ladish, president Ladish Drop Forge Co., Cudahy, Wis., a suburb of Milwaukee. He asserted that his company produced drop forgings principally for the automobile industry, and had a normal annual capacity of 12,000 to 14,000 tons a year, although in a period of abnormal demand in recent years its output was as high as 27,000 tons, running the plant day and night shifts. The principal market for his product, he asserted, was in the State of Michigan, where when the Pittsburgh plus practice was in vogue, he was at a serious disadvantage in competing with Eastern forge shops. When cross-questioned by Mr. Corlett, as to whether this market situation was not the same when his company started business, he replied that the contrary was the case. The original market of his company, he asserted, was in Milwaukee and the West and it was only when the rapid development of the automobile industry leaped ahead of the forging capacity of the country that his company turned its attention to the automobile forging business. He stated that while recently his company had been able to buy carbon steel f.o.b. Chicago it was still the general practice of alloy steel manufacturers to name prices on a Pittsburgh base. He regarded his present ability to buy carbon steel f.o.b. Chicago, as of temporary duration and intimated that a restoration of the Pittsburgh plus practice would seriously endanger the future of his plant. Such a restoration, in his opinion, will come as a result of revived demand from other sources than the automobile industry. Automobile production has over-expanded in recent years and with a continuation of sharp competition the readoption of the Pittsburgh basing point would shut his company out of its market. It is only natural to assume, he averred, that Eastern competitors will be able to produce substantially as satisfactory forgings as his own plant, and with the advantage of the Pittsburgh basing point practice they would be able to take all the business offered. He also pointed out that his plant was not only handicapped through the payment of fictitious freight from Pittsburgh when the Pittsburgh base was in effect, but also through the payment of freight on steel wasted in the process of manufacture. The Pittsburgh forge plant pays only the freight on its finished forgings, while his plant pays not only the freight on the finished product, but also the freight from Pittsburgh on all of the raw

THE IRON AGE

material, of which from 25 to 30 per cent constitutes waste in the form of flash burnt steel, etc.

Contract With Illinois Steel Co.

Mr. Ladish entered as part of his testimony a contract with the Illinois Steel Co. dated May 3, 1920, calling for the delivery of 6000 tons of steel from that time until the close of the year. Mr. Corlett, for the respondents, called attention to the fact that the price quoted was f.o.b. Cudahy, not f.o.b. Pittsburgh, and inquired how the witness arrived at the conclusion that he was buying on a Pittsburgh base.

Mr. Ladish replied that he was able to familiarize himself with the Pittsburgh base market by referring to THE IRON AGE, and other trade papers and also by comparing notes with other steel consumers. In this connection he asserted that the automobile manufacturers had proved of service to him and that on occasion the latter had been able to buy at better advantage because of the quantities they ordered and had permitted his plant to use material they purchased in fashioning their products. Counsel for the commission called attention to the fact that while the price specified in the contract in question was f.o.b. Cudahy, recognition of the Pittsburgh base was given in a clause which protected the mill against advances on freight rates. This clause reads as follows: "The price or prices quoted herein are based upon carload freight rates from Pittsburgh to the place of delivery in effect at the date of this agreement, viz., 29.5c. per 100 lb. In the event of an increase in such freight rates, the amount of such increase shall be added to the price of all materials shipped against this contract during the period in which such increased rate is in effect, and in the event of a decrease in such freight rates, the amount of such decrease shall be deducted from the price of

all material shipped hereunder during the period in which such decreased rate is in effect."

Disadvantage of Cudahy

Mr. White followed Mr. Ladish with a presentation of statistics to show the disadvantage of the Cudahy plant in competing with Eastern forge shops under the Pittsburgh basing practice. Assuming that the Ladish plant and Pittsburgh competitors paid the same price f.o.b. Pittsburgh, Mr. White testified as to the material advantage of the latter in shipping to various Michigan points, notwithstanding that the Ladish company shipped in carload lots and the Pittsburgh plants in less than carload lots, the freight rates on which are higher per mile than on carload shipments. In computing these figures Mr. White assumed that the waste at the Ladish plant averaged 30 per cent of the raw material bought. Assuming that Pittsburgh forge plants also shipped in carload lots, Mr. White presented figures to show that the Ladish plant was at a disadvantage everywhere, ranging from 17.5c. at its own doors to \$1.008 in Pittsburgh. He presented similar statistics to show that Cleveland forge shops would have the advantage at almost as many points of delivery, including Moline, and the Pacific Coast, the only exceptions mentioned being Milwaukee, where the Ladish plant would have an advantage of 11.5c., Minneapolis, where its advantage would be 6.5c., and Duluth, where it would be 3c. In all cases, these figures are based on the assumption that the freight from Pittsburgh to Cudahy is paid regardless of whether the steel actually is shipped from Pittsburgh or from a more western producing point such as Chicago. In this connection it is to be noted that Mr. Ladish testified that 90 per cent of his steel was normally purchased from the Illinois Steel Co.

IMPROVING SLOWLY

Gradual Broadening of Buying at Youngstown—Sheet Prices Firm

YOUNGSTOWN, Jan. 31.—While iron and steel buying shows broadening tendencies, the improvement is below the expectations of Mahoning Valley makers, some of whom do not look for a return to normal conditions in the industry until next fall. In the meanwhile, production schedules are holding at about 40 per cent in finishing lines, varying with different interests. Employment is still substantially below normal and large numbers of men are turned away at the mill gates almost daily. This condition exists despite the fact that the 8-hr. day has been established in the majority of departments of steel plants.

During the first 20 days of January, however, the Erie Railroad moved loaded cars 200 above the average daily movement for the corresponding period in December. Other roads report a proportionate betterment.

The United Engineering & Foundry Co. maintains an average production of but 20 per cent., as compared with an average of 40 per cent. in 1921. "This is painfully low for a virile organization to contemplate," states an official. "It means that only one out of five of our former employees is able to work. But housecleaning has been going on since business fell off; machines have been repaired; costs have been analyzed and cut until, given a reasonable chance, we are in a position to bid successfully for any work offered."

Officials of the Trumbull Steel Co. are somewhat more optimistic over the outlook and say they have two weeks' unfilled tonnage on their books at the current rate of production. Until recently the company operated largely on a week-to-week basis. It has increased its open-hearth operations from four to six furnaces and has enlarged its active tin plate capacity, operating its Liberty plant at Leavittsburg, Trumbull County, in part.

Pig iron is now definitely on an \$18 basis for standard basic. Figures on inquiries for foundry iron continue to be submitted by Valley interests.

Sheet Production Sags

Though production in the sheet division of the in-

dustry again sagged this week, producing interests generally say the situation is representative of a gradual improvement. No large business has come out, which accounts, in a measure, it is claimed, for the stability of current quotations. Several 200-ton and 300-ton orders were placed in the district during the week, while the automobile industry is placing tonnage with somewhat more freedom, though still cautiously. The principal independent maker of full finished automobile stock is booked four to five weeks ahead, its product meeting with general acceptance.

In both sheets and pipe, jobbing and warehouse interests are more active in the market than for some time past. Considerable tonnages of merchant pipe have been placed within the past two weeks by jobbers.

That sheet business is not yet sustained, however, is indicated by the fluctuations in operating schedules. Not more than 35 of 113 sheet mills in the Mahoning Valley are rolling this week, as compared with an average of 43 per cent last week, the best record this year. Suspension of the sheet mill department of the Youngstown Sheet & Tube Co., consisting of 15 mills, is largely responsible for the decline.

There has been an appreciable decline in the volume of new lapweld pipe tonnage, with some current production going into stocks. Ten of the Valley's 17 pipe furnaces are fired.

In plates, the situation is temporarily improved due to the placing of some storage tank tonnage within the past week. Additional business from this source is looked for during February. The base price in the Valley continues at 1.50c.

The strip market is likewise an "in-and-out" affair, with cold rolled moving at 3.50c. base, and hot rolled quoted nominally at 2c. Business in hot strip is being booked at concession prices, however, it is generally admitted. Most of the strip business coming through at present is from the automobile industry.

In a general way, the lighter steel products are holding their own in this territory. Independents are expanding their production of tin-plate, but admit that the going quotation of \$4.75 is being shaded in some quarters, especially to large consumers. It is believed this price is a fair appraisal of the market on moderate tonnage. In finished lines, tinplate is making a better showing than any other product.

American Valuation Has Strong Support

Tariff Conference of National Association of Manufacturers
Meets at Washington—Charles M. Schwab
Sends Vigorous Letter

WASHINGTON, Jan. 31.—Early passage of an adequately protective tariff act with the American valuation plan incorporated was vigorously urged at the two-day convention of the National Association of Manufacturers, attended by approximately 450 delegates. Assembling yesterday morning, the convention closed late this afternoon. After lively discussion of the principle of the American valuation plan preparations were made to combat the strong influences against it. A memorial to the President and members of Congress was adopted in favor of quick action on the legislation, and it will be presented in person to-morrow to the majority members of the Senate Committee on Finance by a committee selected for that purpose. Among the members are Dr. John A. Mathews, president Crucible Steel Co. of America, and C. A. Moffett, of the Gulf States Steel Co.

Delegates who called upon senators and representatives this morning reported back to the convention this afternoon that sentiment in Congress is strongly in favor of the American valuation plan, and early passage of a protective tariff, but the charge was made by Charles J. Webb of Philadelphia that the measure is being held up in the Committee on Finance by two senators, and it was urged that something be done to see that the bill, carrying the necessary protection and the American valuation plan, is reported to the Senate and passed at an early date.

Throughout the convention speakers strongly pointed out the desirability of letting all interests of the country know the meaning of American valuation and the necessity of having it enacted into law as a source of reviving industrial and commercial activities by preventing a flood of cheaply produced foreign goods.

Letter from Mr. Schwab

Strong indorsement of the American valuation plan was given in a letter from Chairman Charles M. Schwab of the Bethlehem Steel Corporation. He declared that "We have American standards in everything but our tariff. To-day, in my opinion, the hour has come when we should put American standards in our tariff laws. The simple and effective way of doing this is by substituting American standards of value for the present archaic standards of foreign values. This is the essence of American valuation which will do for our industries, for our people, for our business, exactly what the gold standard did for currency. It will prevent cheaper currencies of the world from saddling us with economic stagnation.

Mr. Schwab indorsed the purpose of the convention. He declared that indecision is the greatest handicap to progress and that the whole world is calling for action, and that nothing could be more beneficial than a meeting such as that of the association. He cited in support of the American valuation plan the differences in wages paid in the United States and abroad and what it means to the steel industry, transportation and workers in other lines in the United States to permit business to go to foreign countries. Mr. Schwab said:

An ounce of gold to-day in the United States pays the American worker for 17.22 hours of labor as against 50.16 hours in Great Britain, 95.5 hours in Japan, 117.31 hours in France and 201.55 hours in Germany. Last year Congress passed a bill restricting immigration to protect the American worker from the millions of foreigners who would have flooded our labor markets and caused a panic in wages. But what advantage is there to-day to the American worker to have restricted immigration, if, through defects in our tariff, the products of these millions of men and women abroad are now glutting our markets and forcing millions of workers out of their positions? What better employment insurance could we have than a tariff law which insures the

American worker his job in competition with the workmen of the world?

In 1915 it required the work of 5,000 men for one day to make 1,000 tons of steel rails. Let us suppose that to-day an American railroad placed an order for 50,000 tons of rails in Belgium, Germany or England because these rails might be bought for less money abroad than at home. This would mean that 5,000 men in our own country would be idle for 50 days. It would mean that several thousand employees of our railroads would have less work because the railroads would be deprived of hauling these rails and the raw materials such as coal, coke, iron, etc., which come from the mines and furnaces to the mills. It would mean that thousands of miners would have less work if the product of their labor were not used by the mills. It would mean that the workers of the mines, mills and railroads would have less money to spend for the necessities of life with the baker, the grocer or the retailer. This tendency to buy abroad at the expense of our own country is short-sighted economy.

Quick Passage of Tariff Urged

The convention adopted a resolution, prepared as a memorial and addressed to the President and appropriate members of Congress, urging quick passage of tariff legislation carrying adequate protection based upon the American valuation plan where ad valorem duties apply. The resolution was the subject of about one hour's debate, and all speaking on it were in favor of it, with the exception of H. G. Miles, Racine, Wis., representing the Fair Trade League, who insisted that the American valuation would not cure the remedies it seeks to cure, and it was necessary to incorporate in the tariff act a clause covering depreciated currency or to empower the President to select articles produced under American values and bring them up to the American cost and then add a duty.

John P. Wood, Philadelphia, president of the American Woollen Manufacturers' Association, was chairman of the committee on resolutions. Among other members of the committee was C. A. Moffett of the Gulf States Steel Co.

Discussion by members of the convention during Monday was overwhelmingly in favor of the American valuation. The unprecedented depression in agriculture, industry and commerce, vast unemployment, and the general plight of the country were attributed partly to the lack of a protective tariff, with an American valuation administrative feature, and every speaker during the general discussion went on record strongly in favor of quick passage of a protective tariff act and the American valuation plan. Cutlery interests, with exhibits, particularly emphasized the need of this, showing how hopelessly they are being undersold by foreign producers, especially those in Germany. Speakers represented a wide variety of producing interests of the United States.

One of the interesting talks was that made by James B. Reynolds, former Assistant Secretary of the Treasury in charge of customs, and who now represents the Treasury in connection with an investigation being made regarding the American valuation plan for the Senate Committee on Finance. He said that there is no reason why the American valuation plan cannot be operated in every fair and just way. He told the convention that the report prepared under his supervision now is in the hands of the printers. It naturally does not make any recommendation, but carries selling prices here and abroad, price of production by American manufacturers and related data, taken from the books of American producers and importers.

Interview with the President

President John E. Edgerton of the National Association of Manufacturers, who presided at the conven-

tion, told of the interview that a committee from the convention held at noon Monday with President Harding. He stated that the President did not commit himself one way or the other regarding the American valuation plan, but did approve of the suggestion that tariff legislation should be enacted as quickly as possible.

Former Representative William E. Humphrey of Washington, representing the American Valuation Society, attacked the propaganda against the American valuation plan, and at some length sought to reply to claims that have been urged against it, and said that none of them could appeal to reason and intelligence. Among other things, he pointed out that it is easier to learn the American wholesale selling price than the foreign valuation; that it does not increase rates, because it is only an administrative feature and that it would not mean increase in prices to American consumers. He insisted that it is imperative that it be adopted.

President Mathews Speaks

Dr. John A. Mathews, president of the Crucible Steel Co. of America, who said he spoke for 30 makers of tool steel, pointed out that the normal number of employees ranges from 30,000 to 40,000, but to-day does not exceed 25 per cent of the number. It is not raw

steel, but the products from it, which are coming in from Germany. There is possibly an investment of \$200,000,000, he said, in the fine steel industry here, yet they have not been given as great a protection as is given in the common grades of steel. He said American valuation is needed to protect the American fine steel industry. He spoke of the wide difference in the cost of making steel in the United States and abroad.

George T. Kimball, secretary of the American Hardware Association of Connecticut, maker of locks, produced samples of domestic and foreign products and said that German locks are sold at 36c. per dozen, as against the present American production cost of 98c. per doz.

H. L. Hinry, of the American Valuation Society, presented exhibits of razors of domestic and foreign makes, and showed the widespread difference in costs. One type of imported razor, he said, cost \$1.35 per dozen, landed, while the same kind of American razor costs \$4 each.

M. A. Edgar, McIntyre, Ga., of the Mineral Division of the Southern Tariff Association, and other interests in the South, said the mineral interests of the association are 100 per cent in favor of American valuation, and that the other industries for which he spoke have taken a similar position.

GERMAN MARKET WEAKER

Jobbers Shade Prices--Government Control of Scrap Foreseen--Pig Iron Firm

(Special Correspondence)

BERLIN, GERMANY, Jan. 15.—The forcing up of scrap prices during the past few months when the mark was declining daily caused much demand for protection with maximum prices. The result of this is the draft bill recently submitted to the Federal Council. The bill provides for the introduction of maximum prices on old material and empowers the authorities to expropriate stocks whenever such measures are deemed necessary to enforce the law. The scrap interests are vigorously opposing the law and are predicting the utter ruin of this business, but it seems doubtful, provided the law is passed, that the maximum price regulation will immediately come into operation. Indications are that the authorities merely wish to have a weapon to use whenever the price policy should call for it.

The weak tone of the market continued during the past week. Mills are worrying very little over the softening of prices, but jobbers are more inclined to price concessions, which results in considerable variations in quotations. This condition is particularly evident in the finished material market where there is a wide divergence of mills' and jobbers' quotations on many items.

The tone of the pig iron market is firm, a few large deals being closed in Luxemburg and Lorraine iron at an average of 235 fr. per ton. Business in semi-finished material has been light because of the extreme scarcity of material. Mill quotations have been difficult to obtain and merchants have evidently cleaned out their stocks. Rails have sold below the guiding price and concrete bars, heavy sheets and medium sheets were also weaker. In other lines, however, prices are being fairly well maintained, although no increases are noted. The week closed quiet.

Quotations were as follows, per metric ton:

	Marks
Billets, basic (nominal).....	3,900
Sheet bars, basic (nominal).....	3,950
Bar iron.....	6,600 to 6,800
Plats and squares.....	6,200 to 6,400
Rounds.....	6,300 to 6,400
Beams.....	6,000 to 6,400
Hoop iron, ordinary.....	7,000 to 7,300
Rails.....	5,000 to 5,050
Universal plates.....	6,050 to 6,200
Sheets, heavy.....	5,500 to 5,800
Sheets, medium.....	6,700 to 7,200
Plates, light.....	10,500 to 14,500

At the recent meeting of the inland committee of

the Iron Control Federation, it was decided to have a committee representing employers and employees cooperate in the fixing of guiding prices by the Steel Federation (Deutscher Stahlbund). At the first meeting of this joint committee it was agreed to keep the current guiding prices in operation for the present. In view of the anticipated increase of coal taxes and freight rates by February, a meeting has been called for the end of January to again consider a revision of guiding prices. Complaints were heard at the recent meeting that current prices leave practically no profits, often compelling works to operate at a loss. The prevailing price situation is particularly difficult for works which are completing long-term contracts booked at prices considerably below the present-day quotations. Repeated attempts were made, when the boom in business developed, to back out of old contracts or make contracts on a sliding scale. Consumers, however, had learned by experience and insisted upon fixed prices.

German Export Orders

The Siemens China Electrical Engineering Co. will supply machinery for a colliery being organized by the military governor of the province of Chekiang Lu, in connection with the proposed exploitation of coal deposits at the lower Yangtsee. The Gutehoffnungshütte, at Oberhausen, have an Argentine order for a bridge across the Riachuela, valued at 3,100,000 pesos. The material for a railroad on the Carmen de Patagones-Puerto San Antonio line will be placed in Germany. The Hannoversche Waggonfabrik Aktien Gesellschaft, car works at Hanover, has taken a 30,000,000 m. order for Jugo-Slavia. A Saxon railroad car works, the Waggonfabrik Busch, at Bautzen, will reorganize the Phönix car works, at Riga, Russia, and will take a financial interest in a new Lettish company which is to acquire former Russian plants.

The American Engineering Standards Committee has approved as tentative American standard the specifications of the American Society for Testing Materials for cold-drawn Bessemer and cold-drawn open-hearth automatic screw stock, and methods of chemical analysis of manganese bronze and gun metal. Copies may also be obtained from the committee at 29 West Thirty-ninth Street, New York, at a price of 25 cents each.

Charles L. Smith, formerly editorial representative of THE IRON AGE at Cincinnati, has opened an office at 202 Mills Building, El Paso, Texas, as manufacturers' agent and exporter.

EXPORT TRADE IMPROVES

Peking in Market for Rails and Equipment — Other Inquiries from Japan, Brazil and Argentina

New York, Jan. 31.—While there is no appreciable gain in export trade, there is evident a slight increase in the volume of inquiries appearing from all markets and there are several which will close during the next two months. A number of sizeable tonnages for Japan were decided upon before the first of February, included in these being a large tin plate inquiry, rails for the South Manchuria Railway and several thousand tons of structural steel for two bridges. The Japanese market has apparently been slightly affected by the depreciation of the yen in international exchange to about 46c. Purchases of light gage black sheets continue but only on a very limited scale compared to the heavy buying of last year. In a majority of cases bars, plates and structural material continue to be placed in Continental markets. According to one Japanese export house American sellers will eventually be forced to quote on a basis of \$40 per ton, c.i.f. Japanese port, on steel bars, in order to compete with European markets.

A recent rail tonnage for an electric railroad in Japan, placed through a large Japanese export house, is reported to have gone to the leading interest. It calls for 3500 tons of 100-lb. rails for the Hanshin Electric Railway. A recent order from a large oil company in Japan for 95,000 ft. of wire rope in 2000, 3000, and 3500-ft. lengths for use in drilling probably in northern Japan and on Saghalien, may portend further purchases of oil well supplies and equipment. A Japanese telegraph company bought during the past week 100 tons of No. 8 gage wire. One light black sheet inquiry in the market calls for 150 tons.

One of the largest inquiries that has appeared from Chinese markets for some time is from the Peking Tramways for rails and equipment, bids closing March 20. The specifications, which will probably total about \$1,000,000 include 39,000 meters (about 5500 tons) of trolley rails and 2000 meters of T rails, electric motors, armatures, controllers, wheels, axles, two sprinkling cars complete, an automobile truck with tower for repairing overhead wires and other equipment. Although the Chinese Minister of Communications is chairman of the board of the Peking Tramways, there is a considerable investment of British capital in the enterprise, which is operating at a good profit. As a result credit arrangements will probably be made without difficulty.

With the passing of the Chinese New Year on Jan. 28, exporters dealing with the Chinese markets believe there will be a slight revival of business. During the past few weeks there have been numerous inquiries of varying size from the Far East for wire shorts, steel bar crop ends, plate cuttings and other similar material, largely consumed in this part of the world. It has been with the greatest difficulty that exporters handling these inquiries have filled their orders, particularly on the wire shorts. An inquiry from a reputable company in China, which includes fair tonnage of sheets, plain and galvanized, tin plate and other material is again active after several weeks. If it is placed in the American market it will probably total over \$200,000.

A rail inquiry from Mexico has appeared through the Bureau of Foreign and Domestic Commerce. It calls for 4400 tons of 56-lb. rails and accessories for standard gage track, 15 switches complete and about 150,000 wooden railroad ties. While there are numerous inquiries from Mexico and an evident desire to buy a wide range of material, exporters see but small prospect of transacting business as sales, as a rule, must be made on long term credits.

Tenders for bids on traction, transport and construction material involved in the electrification of certain lines of the Central Railway of Brazil have been issued. A fair-sized inquiry for port equipment has been issued by the Argentine Director General of

Navigation and Ports, to be used in improving and developing the port of Buenos Aires. Tenders include locomotives, two cranes, cargo towers, concrete mixers, electric motors, etc. This inquiry and the Brazilian railroad tender are both in the hands of the Bureau of Foreign and Domestic Commerce.

Numerous commercial fairs are to be held throughout Europe during this year. Of the forty or more fairs to be held, only a few have a bearing on the iron, steel or machinery industries. The third annual business fair will be held at Brussels, Belgium, April 3 to 19; an international fair at Utrecht, Holland, Feb. 21; British Industries Fair, London and Birmingham, Feb. 27 to March 10; Lyons Fair at Lyons, France, March 1 to 15; Leipzig Fair, Leipzig, Germany, in the spring and fall. The fair of Rio de Janeiro, Brazil, begins Sept. 7 and closes Nov. 15.

Ford Cars Produced in 1921

It is announced from Detroit that the Ford Motor Co. produced in 1921 a total of 1,054,740 cars, trucks and tractors, closing the year with unfilled orders for 38,260 more, this being sufficient to keep the plant going 11 days at the 1921 average rate. Sales in 1921 are reported at 1,093,000, an increase of 104,213 over 1920 sales, and the highest figure ever reached.

Prices of all models were reduced, effective Jan. 16, to the following (all f.o.b. Detroit):

Touring car, \$348; runabout, \$319; chassis, \$285; coupe, \$580; sedan, \$645; truck chassis, \$430; tractor, \$625. The starter remains at \$70.

Crane Makers and Government Co-operate

WASHINGTON, Jan. 31.—A delegation representing 75 per cent of the manufacturers of cranes and 98 per cent of the production in the United States held a conference here yesterday with Assistant Secretary Huston and other officials of the Department of Commerce and discussed plans looking to closer co-operation between the crane makers and the department. The discussion is said to have related to several subjects, including standardization, sales promotion, costs and production.

Commissioner's Nomination Held Up

WASHINGTON, Jan. 31.—The nomination of George W. Upton, of Warren, Ohio, to the Federal Trade Commission, has been held up by objection of Senator Pomerene, Democrat, of Ohio. Mr. Upton is the husband of Harriet Taylor Upton, vice-chairman of the Republican National Committee, and Senator Pomerene says the appointment is a reward for Mrs. Upton's services.

Merger Negotiations Still On

Reports that merger negotiations of independent steel manufacturers have fallen through are not founded on facts. Although it is true that several propositions put to the various companies interested have been rejected, negotiations are still proceeding. Conferences will be held in New York on Thursday and Friday of this week by those working on the tri-company consolidation.

The so-called minimum wage ordinance enacted by the common council of Milwaukee on Sept. 8, 1921, to control the wages of municipal employees, has been declared constitutional by the Circuit Court, which denies the petition of Herman A. Wagner, president Wisconsin Bridge & Iron Co. and others, to restrain the city of Milwaukee from enforcing the requirements of the statute.

Smith & Wesson, Springfield, Mass., firearms plant, closed since July last, has resumed operations with about 300 employees, or about one-third the normal force. With the resumption of operations a 20 per cent reduction in wages and salaries went into effect.

Iron and Steel Markets

SOME IMPROVEMENT

Better Outlook in Construction Lines

Steel Corporation's Operations Increase At Chicago--Further Price Concessions

As January ends, the amount and character of new demand for steel products is somewhat better than at any time in the month. The larger amount of new construction work ahead, not omitting a better prospect here and there for shipyards, accounts in the main for the improvement, but there is also a healthy volume of replenishment buying.

Chicago rather than Pittsburgh sees conditions in a more favorable light. Operations in the Chicago district are at a higher rate, bringing the Steel Corporation's average for all districts up to 46 per cent.

Of the Illinois Central rail order 16,000 tons was divided between Chicago district mills, while 20,000 tons went to Ensley, Ala. Car builders have given Western mills some good specifications, and 800 new freight cars and the repair of 500 hopper car bodies are included in the week's new business.

Activity in fabricated steel is still the brightest spot. Besides 20,000 tons placed with the American Bridge Co. for the Chicago Union Station, other awards totaled more than 21,500 tons. The volume of new work appearing was about 13,500 tons.

In concrete reinforcing bars a 2000-ton inquiry for Louisville, Ky., and one of 1700 tons for a Seattle pier are conspicuous.

The outlook for shipyard work is improving, though plate-makers have not built high hopes on 1922 as a vessel year. A number of passenger liners are being figured on at the Eastern seaboard, including two for the Old Dominion Line. Five Erie Canal barges are to be built at Chester, Pa., and four Welland Canal boats at Three Rivers, Quebec. Orders have not yet come from recent inquiries sent to Great Lakes shipyards.

Inquiries from Great Britain for a round tonnage of American sheet bars and for 12,000 tons of re-rolling billets are taken to indicate that German or Belgian mills have been unable to make deliveries on some of their contracts. On a foreign bar inquiry 1.30c., Pittsburgh, has been quoted.

Altogether, the week's developments have been more encouraging as to the impetus to come from the seasonal buying expected in the next two months.

In wire and wire nails the South and Southwest have given the first evidence of activity in preparation for spring work. Wire prices show little variation, but in nails recent reports of slight concessions for \$2.50 per keg are confirmed.

The plate orders placed for the latest oil tank work in the Central West indicate that several mills are willing to go to 1.40c., Pittsburgh, for attractive business.

Sheets have been the chief exception to recent reports of irregular prices. But sheet buyers have been particularly cautious and in the past week 3.90c. on galvanized sheets has been established, or

\$2 per ton under the usual market. In blue annealed sheets the competition of plate mills has been felt and in some cases a 1.50c. plate base has been used, resulting in 1.80c. for No. 10.

In the past week the American Sheet & Tin Plate Co. has added to its active tin plate mills, the industry as a whole being on an 80 per cent basis.

The Steel Corporation's statement for the last quarter of 1921, showing net earnings of \$1,700,000 greater than in the third quarter, reflects the 40 per cent increase in output in the last quarter, with the offset of lower prices than the average for the third quarter.

With price concessions freely made on pig iron at Buffalo, Chicago and other Northern centers, and with Alabama iron outside of the immediate Birmingham district selling at \$15.50, furnace, the market is weak, and, with the exception of about 10,000 tons inquired for by Eastern heater manufacturers, no tonnage of considerable size is pending. There is, however, some evidence of increase in melt at a number of jobbing foundries.

Some falling off in merchant pig iron production is likely in the East, two furnaces being scheduled for blowing out.

The week shows a further recession in the composite prices of THE IRON AGE. That for steel is now 2.048c. per lb. against 2.062c. a month ago, 3.057c. a year ago and 1.684c. averaged for the ten years before the war. The pig iron composite is \$18.31 per gross ton, against \$18.60 a month ago, \$30.35 a year ago and \$15.72 the 10-year pre-war average.

Pittsburgh

PITTSBURGH, Jan. 31.

While the first month of 1922 showed some gain in the number of orders booked as compared with the last month of last year, there is disappointment that the gain has not been more pronounced in view of the almost universal belief that stocks in distributing and consuming hands were pretty low at the end of the year. Conservatism still is the keynote of buying and while few expect a reduction in freight rates to be made in the next few months, this, nevertheless, is the most restrictive influence upon buying. Buyers are taking on only their immediate supplies and refraining from building up stocks of materials "loaded" with to-day's freight charges. Very few big individual tonnages are included in the current inquiries. The largest are in plates in connection with some recent tank orders. Consequently, it is rather difficult to discern prices on sizable tonnages. Since what ordinarily would be regarded as resale lots of plates, shapes and bars can be bought easily at 1.50c., Pittsburgh, it is patent that large tonnages would not be placed that high. The common impression is that the basis of such business is 1.40c., although there is considerable hesitancy on the part of manufacturers in admitting this price, probably because of its effect upon buyers' ideas. It is a buyers' market and even in sheets there are signs this week of deviations from the regular market quotations. A lot of 250 tons of galvanized sheets has been sold at 3.90c., base, Pittsburgh, or its equivalent. Prices of wire products remain indefinite, but there is not much doubt that large buyers of nails are obtaining them at \$2.40, base per keg, Pittsburgh.

Variations in the activities of steel plants of this

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Jan. 31, 1922	Jan. 24, 1922	Jan. 3, 1922	Feb. 1, 1921
No. 2X, Philadelphia...	\$21.34	\$21.34	\$21.24	\$32.09
No. 2, Valley furnace...	19.00	19.00	19.50	29.00
No. 2, Southern, Cin'ti...	20.50	20.50	21.00	34.50
No. 2, Birmingham, Ala...	16.00	16.00	16.50	30.00
No. 2 foundry, Chicago...	18.50	19.00	19.00	30.00
Basic, del'd. eastern Pa...	19.84	20.25	20.25	31.40
Basic, Valley furnace...	18.00	18.00	18.25	30.00
Bessemer, Pittsburgh...	21.46	21.46	21.96	32.96
Malleable, Chicago...	18.50	19.00	19.00	30.50
Malleable, Valley...	19.50	19.50	19.50	30.00
Gray forge, Pittsburgh...	20.96	20.96	20.96	29.96
L. S. charcoal, Chicago...	30.50	30.50	31.50	40.50
Ferromanganese, seaboard	58.35	60.00	60.00	90.00

Rails, Billets, etc., Per Gross Ton:	Jan. 31, 1922	Jan. 24, 1922	Jan. 3, 1922	Feb. 1, 1921
O.-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh...	28.00	28.00	28.00	43.50
O.-h. billets, Pittsburgh...	28.00	28.00	28.00	43.50
O.-h. sheet bars, P'gh...	29.00	29.00	29.00	47.00
Forging billets, base, P'gh	32.00	32.00	32.00	48.50
O.-h. billets, Philadelphia	33.74	33.74	33.74	49.24
Wire rods, Pittsburgh...	36.00	36.00	36.00	57.00
Skelp, gr. steel, P'gh, lb...	1.50	1.50	1.50	2.45
Light rails at mill	1.50	1.50	1.55	2.75

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.81	1.81	1.85	2.70
Iron bars, Chicago...	1.60	1.60	1.60	2.68
Steel bars, Pittsburgh...	1.50	1.50	1.50	2.35
Steel bars, Chicago...	1.60	1.60	1.60	2.73
Steel bars, New York...	1.83	1.83	1.88	2.73
Tank plates, Pittsburgh...	1.50	1.50	1.50	2.50
Tank plates, Chicago...	1.60	1.60	1.60	2.88
Tank plates, New York...	1.83	1.83	1.83	2.88
Beams, Pittsburgh...	1.50	1.50	1.50	2.15
Beams, Chicago...	1.60	1.60	1.60	2.83
Beams, New York...	1.83	1.83	1.88	2.83
Steel hoops, Pittsburgh...	1.90	1.90	2.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
 †Silicon, 1.75 to 2.25 ‡Silicon, 2.25 to 2.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 31, 1922	Jan. 24, 1922	Jan. 3, 1922	Feb. 1, 1921
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.70
Sheets, blue an'd'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh...	2.50	2.50	2.50	3.25
Plain wire, Pittsburgh...	2.25	2.25	2.25	3.25
Barbed wire, galv., P'gh	3.15	3.15	3.15	4.10
Tin plate, 100-lb. box, P'gh	\$1.75	\$1.75	\$1.75	\$7.00

Old Material, Per Gross Ton:	Jan. 31, 1922	Jan. 24, 1922	Jan. 3, 1922	Feb. 1, 1921
Can wheels, Chicago...	\$15.00	\$15.00	\$15.50	\$22.00
Can wheels, Philadelphia...	16.50	16.50	16.50	25.00
Heavy steel scrap, P'gh...	14.00	14.00	14.50	18.00
Heavy steel scrap, Phila...	12.00	11.50	11.50	14.50
Heavy steel scrap, Chgo...	11.25	11.50	11.50	15.50
No. 1 cast, Pittsburgh...	16.00	16.50	16.25	28.00
No. 1 cast, Philadelphia...	16.50	16.50	16.50	28.50
No. 1 cast, Chgo (net ton)	13.00	13.00	12.50	18.50
No. 1 RR wrot, Phila...	14.50	14.50	14.50	20.00
No. 1 RR wrot, Chgo (net)	10.50	10.50	10.50	14.00

Coke, Connellsville, Per Net Ton at Oven:	Jan. 31, 1922	Jan. 24, 1922	Jan. 3, 1922	Feb. 1, 1921
Furnace coke, prompt...	\$7.75	\$2.75	\$2.75	\$4.50
Foundry coke, prompt...	3.75	3.75	3.75	6.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	13.02 1/2	13.75	13.87 1/2	13.25
Electrolytic copper, refinery	13.37 1/2	13.50	13.62 1/2	12.75
Zinc, St. Louis...	4.50	4.65	4.82 1/2	5.00
Zinc, New York...	4.85	5.00	5.17 1/2	5.30
Lead, St. Louis...	4.40	4.40	4.40	4.80
Lead, New York...	4.70	4.70	4.70	4.85
Tin (Strait), New York...	32.00	31.25	32.75	33.00
Antimony (Asm'tle) N. Y.	4.90	4.45	4.50	5.25

Composite Price, Jan. 31, 1922, Finished Steel, 2.048c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Jan. 24, 1922, 2.062c. Jan. 3, 1922, 2.063c. Feb. 1, 1921, 3.036c. 10 year pre-war average, 1.684c.
These products constitute 88 per cent of the United States output of finished steel.	

Composite Price, Jan. 31, 1922, Pig Iron, \$18.31 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Jan. 24, 1922, \$18.30 Jan. 3, 1922, 18.60 Feb. 1, 1921, 30.35 10-year pre-war average, 15.72
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and nearby districts are slight. As intimated in THE IRON AGE last week, the Jones & Laughlin Steel Co. has started up another blast furnace at its Woodlawn, Pa., works, and now has seven of its 12 stacks making iron. The Trumbull Steel Co., Warren, Ohio, and the Weirton Steel Co., Weirton, W. Va., have added to their active steel-making capacity, while among finishing mills we note the starting up of 12 more hot mills by the McKeesport Tin Plate Co., bringing the total number in operation to 36. The Washington Tin Plate Co., after being down for about eight months, to-morrow will resume operations at the rate of about 50 per cent of capacity. This plant resumes on an open shop basis after having been a union plant since the war. The American Sheet & Tin Plate Co. also has added to its active tin plate mills and taking the tin plate industry as a whole, close to 80 per cent of the mills are in operation. This is the most active spot in the entire industry. Pipe mills make the next best showing with about 70 per cent and then follow the sheet mills, which because of the fairly high rate of the leading interest are averaging more than 40 per cent of capacity.

The pig iron market has relapsed into dullness.

Continued weakness is noted in the heavier grades of scrap because the steel companies are out of the market and dealers are loath to take on tonnages since the prospect is poor for an early turnover.

The possibility of a strike of the union coal miners on April 1, on the issue of wages has stimulated slightly the inquiry for coal, but thus far there has been no corresponding stiffening in prices.

Pig Iron.—Both inquiries and sales have been small in the past week and it is impossible to make any change in prices, although the trend, if there is a definite one, is lower. The Allegheny Steel Co. has put out an inquiry for 1000 tons of basic for early delivery this being the only important business now before the trade. Makers having stocks of this grade on their yards are holding it at \$18, but there is a possibility that more of the re-sale iron which recently sold at \$17.75, will become available at that price or even less. Business in foundry iron has been entirely of carload lots, with the exception of 500 tons of No. 2 soft Southern iron sold to a local sanitary ware interest for its Southern works at \$16, Birmingham. The market on Northern No. 2 foundry iron now is \$19 Valley furnace for carload lots, leaving open the inference that less

could be done on larger tonnages. W. P. Snyder & Co. make the average price of basic iron from Valley furnaces for January \$18.1875 as compared with \$18.6375 in December, and on Bessemer \$19.594, in January compared with \$20 in December.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$18.00
Bessemer	19.50
Gray forge	19.00
No. 2 foundry	19.00
No. 3 foundry	\$18.75 to 19.00
Malleable	19.50

Ferroalloys. Interest in the market has again subsided and practically the only important transaction of the week was a sale of 150 tons of 80 per cent ferromanganese to American Steel Foundries, the business going to Carnegie Steel Co. The common impression is that the sale was done at less than the equivalent of \$58.35 Atlantic seaboard. The general quotation of American, English and German makers is \$58.35 Atlantic seaboard on 80 per cent material, but it cannot be said that this price has very substantial basis in sales. There is almost no interest at all in 50 per cent ferrosilicon, but we note a sale of 50 tons of 12 per cent electric furnace Bessemer ferrosilicon at \$37 delivered, Pittsburgh. This compares with \$45.10 f.o.b. Jackson and New Straitsville, Ohio, on the same grade of material produced in a blast furnace. Hardly enough demand exists for spiegeleisen to establish prices. Leading makers are nominally quoting \$25 to \$26, f.o.b. furnace.

We quote 78 to 82 per cent ferromanganese \$62 to \$63.67 for domestic and \$58.35 c.i.f. Atlantic seaboard for English and German. Average 20 per cent spiegeleisen nominal at \$30 to \$32 delivered Pittsburgh or Valleys, 50 per cent ferrosilicon domestic, \$44 to \$45 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.50; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 3 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—An effort is observed in some quarters to re-establish \$32 as the price of sheet bars, but so far as can be learned it has not yet been successful, due to the fact that demands are small. We still regard \$29 to \$30, Pittsburgh or Youngstown, as fair appraisal of today's price possibilities, with the lower figure likely to prevail on attractive tonnages. There is practically no interest at all in billets or slabs and quotations are merely an appraisal of what might be done if any business appeared.

We quote 4 x 4 in. soft Bessemer and open hearth billets at \$28 to \$29; 3 x 3 in. billets, \$29 to \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$29 to \$30; forging billets, ordinary carbon, \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—As a sale price, \$38 Pittsburgh or Youngstown for the base size of common soft rods has disappeared and a range of from \$36 to \$37 is more representative of what lately has been done on domestic business. Even lower prices are going on export orders which have been fairly numerous during the past few weeks. Prices are given on page 381.

Steel Skelp.—The market is holding fairly well at 1.50c. for pipe skelp, but going business involves such small tonnages that this price must be regarded as nominal and largely untested.

Wire Products.—Producers in this district still insist that there has been no abandonment of \$2.50 base per keg, Pittsburgh, for nails, nor of \$2.25 base per 100-lb. Pittsburgh for bright wire as far as the Pittsburgh district is concerned, but it is admitted that sales of nails have been done at \$2.40 base Pittsburgh elsewhere, and that in competitive territory equalization of freights is essential to the securing of business. There is a fairly good run of orders for nails, but they are mostly for small lots to meet the immediate requirements of buyers. Advance buying is stifled by the uncertainty which surrounds prices. Demand for wire still reflects the depression in agricultural centers.

We quote wire nails at \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Steel Rails.—Light rails still are held by leading makers rolling them from new steel, at 1.50c. base, but demand is very limited and sales at that figure are rendered difficult by the willingness of makers of re-rolled rails to take orders at 1.45c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.45c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Orders run almost exclusively to carload or less than carload lots. On such business 1.50c. is the common base and it is probable that the appearance of sizable orders would bring out lower quotations. The demand for iron bars also is light and quotations are more of an asking than a selling basis.

We quote steel bars rolled from billets at 1.40c. to 1.50c.; reinforcing bars, rolled from billets, 1.40c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Lettings of fabricated steel still are few and those exceeding 100 tons are rare. The McClintic-Marshall Co. will furnish 300 tons for a nurses' dormitory for the West Penn Hospital, Pittsburgh and 200 tons for a new slag crushing plant for the Shenango Furnace Co., Sharpsville, Pa., to replace one destroyed by fire a few weeks ago. The Jones & Laughlin Steel Co. will furnish 100 tons of steel for an extension to the B. F. Jones Building, Pittsburgh, and 75 tons for the Franklin Exchange of the Bell Telephone Co. of Pennsylvania. The Pittsburgh-Des Moines Steel Co. has taken 100 tons for a school building and dormitory for Shadyside Academy, Aspinwall, Pa. According to figures compiled by the Building Construction Employers' Association, work is under way or projected in the Pittsburgh district amounting to more than \$14,000,000. Most of this total, however, is projected work which has not been placed and the common belief among fabricators is that much of it will be deferred until labor costs are more reasonable. Plain material is in light demand and with small lots selling at 1.50c. base, it is commonly believed that sizable tonnages could be placed for less. Prices are given on page 381.

Plates.—The Phoenix Iron Works, Meadville, Pa., which recently secured the order for several tanks for the Sinclair Oil Co., requiring about 5000 tons of plates, is reported to have covered on the latter with a Youngstown maker at 1.40c., Pittsburgh, or its equivalent. The common quotation of Pittsburgh, Wheeling and Youngstown makers is 1.50c., Pittsburgh, but only small lots can be sold at that figure.

Sheets.—The leading interest continues to report a fairly satisfactory run of orders and specifications, but the report from independent companies is of a different tenor. This condition is finding reflection in a less rigid adherence to the regular market quotations. We note one sale of a fair sized tonnage of galvanized sheets for shipment to the Southwest at 3.90c. base, Pittsburgh, or its equivalent. There is a good deal of pressure against prices on the part of buyers and while manufacturers claim that anything less than 3c. for black or 4c. for galvanized sheets spells a loss, buyers counter by recalling sales \$5 per ton less when manufacturing costs were higher than they are to-day. This conflict of views over prices is confining purchases closely to actual needs. Prices are given on page 381.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Orders are fairly satisfactory in merchant pipe and makers are quoting against a number of line pipe inquiries, among them one for 100 miles of 12-in. pipe for a gas line out of the Monroe, La., field. Oil well pipe is slow. The trade is not expecting a very large spring business in oil country pipe because of the likelihood of an early drop in the price of midcontinent crude oil. The spring demand promises better in merchant pipe because of the bright prospect of much house construction this year. Concessions from card prices are being made, notably in the case of line pipe. Discounts are given on page 381.

Boiler Tube.—There is so much irregularity to prices that the buyers are frightened off or are taking only such tonnages as they see a use for, in the fear of not getting in at the lowest prices. Discounts are given on page 381.

Hot-Rolled and Cold-Rolled Strips.—January proved a fairly good month with most makers, but orders, though fairly numerous, generally were for small tonnages, and the market was not particularly satisfactory, viewed from a price standpoint. There has been good observance of \$3.50 base, Pittsburgh, for cold-rolled strips, but this attitude has frequently resulted in a reduction in intended purchases, while on hot-rolled strips competition from the product of plate, skelp and jobbing mills has made difficult the maintenance of the official quotation of 2c. base, Pittsburgh.

Tin Plate.—The recent lull in buying was short lived, as the past week has seen a substantial rally. Specifications are heavier than they were recently, and new orders are more numerous. On production tin plate, the official quotation remains at \$4.75 per base box, Pittsburgh, but this is above the basis of contracts placed by the large container manufacturers. There has been some business in stock tin plate at \$4.50, and even as low as \$4.25, in cases where buyers were willing to take a fairly large percentage of undesirable sizes.

We quote standard production coke tin plate at \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—January was a better month in the number of orders than the trade had experienced in several months, but individually and in the aggregate the bookings were small in comparison with capacity. Occasional sales of screw stock are being made at 2c, but as a general proposition 1.90c. today is maximum on carload lots. It is claimed that at 1.90c. there is no profit with hot-rolled bars at 1.50c. Pittsburgh because that means 1.60c., including the straightening charge, which makers of the latter are insisting upon, while labor charges in the conversion are said to be at least \$4 per ton. Ground shafting is unchanged at 2.25c. base, f.o.b. mill, for carloads.

Hoops and Bands.—Business in these products is dull almost to the point of stagnation. As nearly as can be arrived at on the limited business done, hoops are quotable at 1.90c. to 2c. base, Pittsburgh, and bands at from 1.75c. to 1.90c.

Nuts and Bolts.—There is no change in the situation with makers in this district, business being poor and prices very unremunerative, especially in competitive territory. Action of Chicago district makers in naming Chicago or mill bases practically shuts out makers in this district because of the high freight charges they would have to absorb to get into that district. Discounts are given on page 381.

Rivets.—There is no improvement in business and while leading makers here are holding heavy rivets at \$2.25 to \$2.35 base per 100-lb., they are losing more business than they are getting at those prices. Lower prices prevail both in the East and West and local makers are disinclined to meet this competition because of heavy freight charges which would have to be absorbed. Prices and discounts are given on page 381.

Spikes.—The interest of the trade is centered on an inquiry from New York Central Lines for 40,000 to 50,000 kegs for the various subsidiary systems of that road. The most recent large sales of standard spikes was at \$2.15 base per 100 lb. and it is probable that the New York Central business will go even lower because of its size and the keen competition among makers for orders. Interest in small spikes is limited. Prices are given on page 381.

Steel Chain.—In a new card dated Jan. 10, leading makers of steel chain have increased the discounts 5 to 10 per cent on butt, stage, breast and a number of other kinds of chain and products coming under the harness chains and saddlery hardware classification.

Coke and Coal.—The coke market has been featured by a rather brisk demand for foundry grade and while

this has not brought about any advance in price it has at least checked an impending decline. Spot tonnages of standard 72-hr. coke still are moving from \$3.75 to \$4.25 per net ton even. About the only outlet for such tonnages of furnace coke as are coming upon the market is to the bakeries, brick plants and for heating purposes. Hardly any demand is coming from the blast furnaces, as the stacks now in blast are covered by contract. Spot furnace grade of coke is selling from \$2.75 to \$3 per net ton even. Non-union steam coal for spot or prompt shipment is quotable at \$1.35 to \$1.50 per net ton, mines, run-of-mine grade, and non-union by-product coal of the same grade from \$1.45 to \$1.75. Mine run gas coal holds within the range of \$2 to \$2.35. An effort is being made to obtain higher prices on all grades, but there is too much coal loaded in cars along sidings to allow of any advance in price.

Old Material.—Some demand from melters still exists for turnings, borings, and compressed sheets, while one steel company is in the market for a fair-sized tonnage of heavy breakable cast. The market on these grades in consequence, is holding firm, but on the heavier grades, the tendency of prices is in the opposite direction. Practically all users of heavy scrap are out of the market and this has caused dealers to reduce the prices they are willing to pay for material to throw down on their yards. Heavy melting steel is quoted at \$14 to \$14.50, but the more common bid of dealers now is \$14.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	\$14.00 to \$14.50
No. 1 cast, cupola, etc.	16.00 to 16.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Huntington, W. Va. and Franklin, Pa.	15.00 to 15.50
Compressed sheet steel	11.75 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	17.50 to 18.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	12.50 to 13.00
Iron car axles	23.00 to 24.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	16.00 to 16.50
Cast iron wheels	15.00 to 15.50
Roller steel wheels	14.50 to 15.00
Machine shop turnings	10.00 to 10.50
Sheet bar, cast ends	14.00 to 14.50
Heavy steel axle turnings	11.50 to 12.00
Sheet shoveling turnings	11.50 to 12.00
Heavy breakable cast	14.50 to 15.00
Stave plate	12.50 to 13.00
Cast iron borings	11.50 to 12.00
No. 1 railroad wrought	11.50 to 12.00

The working force of the Minneapolis Steel & Machinery Co., Minneapolis, will be substantially increased within the next 30 days to handle the regular spring business, according to an announcement by G. M. Gillette, president. The company recently reopened its foundry and is making castings for motors and agricultural machinery.

It is reported by the National Safety Council that the number of persons killed in automobile accidents in the United States in 1921 was approximately 16,000, compared with 11,000 persons in 1920. It has been figured from this that, in 1921, there was on the average a death every 35 minutes, as a result of automobile accidents.

Lieut. Col. A. E. White, director department of engineering, University of Michigan, Ann Arbor, Mich., was the principal speaker at the monthly meeting, Jan. 3, of the Pittsburgh Chapter of the American Society for Steel Treating. His subject was "Top Discard and Its Relation to Quality."

The Western Electric Co., Chicago, is preparing plans for a copper wire mill 305 ft., and a large warehouse extension and a cabinet factory to be erected at the Cicero, Ill., plant. The mill will draw fine wire for the company's own use in the manufacture of telephone and telegraph equipment.

Chicago

CHICAGO, Jan. 31.

Both mills and warehouses report an improvement in demand. While individual orders and inquiries are usually small, they are numerous and come from widely distributed sources. The leading jobber failed to suffer a sharp drop in orders in the last week of the month, the first time in over a year. Although it is unlikely that any buyers are covering their needs for any considerable period ahead, it is evident that the passing of inventory taking has released a healthy volume of replenishment purchases. Mills continue to receive generous specifications from car builders and the impending purchase of 7300 cars by the Burlington will put additional tonnage on their books.

In the fabricating field the headhouse and concourse of the Chicago Union Station, requiring 20,000 tons, has been awarded to the American Bridge Co. While the trend of business appears to have turned upward, the tendency in prices is toward greater uniformity. On steel plates, shapes and bars the maximum ruling quotation seems to be 1.60c., Chicago, as little current business is moving at 1.65c. or 1.70c. It is felt in some quarters, however, that it would take little to change the complexion of the market. In this connection, it is to be noted that the merchant bar mill of the Inland Steel Co. started operating double turn to-day with three weeks' bookings ahead. The sheet capacity of the same producer is booked through March.

Betterment in demand is reflected in the improved operating situation among local producers. The Illinois Steel Co. is now on a 43½ per cent basis as against 37½ per cent last week. The Inland Steel Co. is operating at from 45 to 50 per cent of ingot capacity. Its entire No. 1 side is now active and the company expects to start the No. 2 side by the middle of February. The Gary rail mill of the Illinois Steel Co. resumed operation yesterday with a backlog which will justify an output of 7000 tons a week for three or four months.

Pig Iron.—Inquiry is more active, but actual bookings are still light. The Western Electric Co. has placed an order for 200 tons of Northern foundry for prompt shipment, and there have been a fair number of orders ranging in size from a carload to 100 tons. Shipments from local merchant furnaces are gradually increasing, but nevertheless some iron is still being piled. The trade finds its chief encouragement in the increase in inquiries. Among them may be mentioned 300 to 500 tons of malleable for February delivery, 100 tons of malleable for similar shipment, 100 tons of No. 2 Northern foundry for February and March delivery, 100 tons of 4 to 5 per cent foundry for February shipment, 300 tons of No. 2 foundry for February to April delivery, and 400 to 500 tons of low phosphorus wanted by a local interest for both Eastern and Western plants. On local foundry, basic and malleable \$19, base furnace, is still generally quoted, but some business is being taken at a concession of 50c. On copper free low phosphorus, \$36 delivered, or about \$30.50 f.o.b. furnace, appears to be the ruling market. A sale of a carload of 10 per cent silvery at the Jackson County schedule is reported.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil. 1.50, delivered at Chicago	\$30.50 to \$31.50
Northern coke No. 1 sil. 2.25 to 2.75	19.00 to 19.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25	18.50 to 19.00
Northern high phosph.	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	22.17 to 22.67
Malleable, not over 2.25 sil.	18.50 to 19.00
Basic	18.50 to 19.00
Low phosph., Valley furnace, sil. 1 to 2	
per cent copper free	30.50
Silvery, sil. 8 per cent	32.82 to 34.82

Ferrosilloys.—Two carload sales of spiegeleisen are reported, one of them for local delivery, having been made at \$36.10, freight allowed. The furnace which sold the material, however, is out of blast and has practically exhausted its stocks. The American Steel Foundries has closed for about 150 tons of ferromanga-

nese and is said to have done so at less than the prevailing market of \$58.35, seaboard.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$56 to \$57.50, delivered; spiegeleisen, 18 to 22 per cent, \$36.50 to \$37, delivered.

Railroad Rolling Stock.—The Santa Fe has placed eight dining cars with the Pullman Co. The New York, Chicago & St. Louis has ordered 300 steel underframe stock cars from the Illinois Car & Mfg. Co. The Baltimore & Ohio has let repairs on 500 hopper car bodies to the Pressed Steel Car Co.. Cudahy Brothers, packers, Cudahy, Wis., have ordered 500 refrigerator cars from the Pullman Co. The Delaware, Lackawanna & Western has bought five passenger locomotives from the American Locomotive Co.

Rails and Track Supplies.—The Illinois Central has bought 30,000 tons of rails, of which 14,000 tons will be rolled by the Tennessee Coal, Iron & R. R. Co., 11,000 tons by the Illinois Steel Co., and 5000 tons by the Inland Steel Co. A few small orders for rails ranging from 1000 to 2000 tons have been booked by the Gary mill within the past week. Local mills expect to get a share of the 24,000 tons of rails to be ordered by the Chesapeake & Ohio and the Hocking Valley. The Louisville & Nashville has distributed orders for track supplies as follows: 2700 tons of splice bars to the Inland Steel Co., 7500 kegs of spikes to the Jones & Laughlin Steel Co., 3500 kegs of bolts to the Illinois Steel Co. Track supplies still show a tendency toward weakness. On standard spikes 2.10c., Pittsburgh, appears to be the market, whereas 3.10c., Pittsburgh, is a common quotation on track bolts and even less than that is reported to have been done. The ruling price on iron and steel tie plates is \$35, f. o. b. mill. As noted in the New York market last week, the Great Northern is inquiring for 450,000 steel tie plates, but in view of the season it is not expected that the business will be placed immediately. There is little demand for light rails.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.60c. f.o.b. makers' mills.

Standard railroad spikes, 2.10c., Pittsburgh; track bolts with square nuts, 3.10c., Pittsburgh; tie plates, steel and iron, 1.75c., f.o.b. mill; angle bars, 2.10c., f.o.b. mill.

Bars.—Mills report a measurable improvement in the demand for mild steel bars. Both manufacturing consumers and jobbers are commencing to replenish their stocks of merchant bars and specifications are being received from carbuilders. The demand for reinforcing bars also promises to increase, as numerous building projects are being figured on. One reinforcing bar company has just placed an order for 2000 tons with a local mill. No material change is to be noted in prices, 1.60c. to 1.70c., Chicago, being quoted on ordinary tonnages, while it is conceded that large orders have gone at as low as 1.55c. and 1.50c., Chicago. Purchases running into tonnage are confined principally to carbuilders. The demand for bar iron continues to fluctuate from week to week, bookings during the past few days having tapered off. That the situation is better, however, than during the closing months of 1921, is evidenced by the fact that one local mill is entering its eighth week of uninterrupted operation. Hard steel bar business is still light, although a betterment in demand for reinforcing purposes is to be noted.

Mill prices are: Mild steel bars, 1.60c. to 1.70c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.80c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.13c.

Wire Products.—Buying is active in the South and Southwest where jobbers are replenishing their stocks. Orders for nails are fairly heavy and poultry netting is also in demand. A slight, though by no means pronounced, improvement in demand for wire by manufacturers is reported. Prices are fairly firm, although some localized shading by Southern mills is noted. For mill prices, see Finished Iron and Steel, f. o. b. Pittsburgh, page 381.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$3.95 per keg.

Sheets.—Further business has been booked for export to Japan and domestic consumers are beginning to take more interest in the market. The local independent has built up a backlog which will keep its mills running full for two months. Fully 50 per cent of these bookings is for foreign account. Prices are firm.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 3.88c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has been awarded 800 tons for Rockford, Ill. The Lynchburg Foundry Co. was the successful bidder on 800 tons for Grand Rapids, Mich., its figure having been \$32.40, base Birmingham. The Central Foundry Co. was low bidder on 300 tons for Lawrence, Kan. Brillion, Wis., takes bids Feb. 7 on 375 tons. The present market appears to range from \$32.50, Birmingham, to \$33.50 for 6-in. and above. The extra for class A and gas pipe has been reduced to \$3. Sellers report much work in prospect.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$45.60 to \$46.60, 6-in. and above, \$11.60 to \$12.60, class A and gas pipe, \$3 extra.

Bolts and Nuts.—Although demand is still far from satisfactory, some improvement in buying is to be noted. A number of fair-sized orders have been received from jobbers, and the automobile industry is commencing to take interest in the market. The Studebaker Corporation is inquiring for a considerable quantity of bolts. The price situation is still weak, and even nominal discounts in this territory are below those quoted on page 381. Asking prices on machine bolts appear to be 70, 10 and 10 off for small rolled thread, 70 and 10 off for small cut thread, and larger and longer; 70, 10 and 5 off for large carriage bolts; and 80, 10 and 10 off for stove bolts. In other respects the discounts quoted on page 381 represent the nominal market.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to 3/4 x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to 3/4 x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off, blank nuts, \$1 off, coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—Interest is centered in the Chicago Union Station headhouse and concourse, the steel for which, amounting to 20,000 tons, was awarded to the American Bridge Co. late to-day. A fair amount of fabricating business is in prospect, although during the past week few new inquiries have appeared. Fabricating awards include:

Kittitas County Wash., 200-ft. pin span, Ellensburg, Wash., 119 tons, to Minneapolis Steel & Machinery Co.

Lincoln Junior High School, Minneapolis, 139 tons, to American Bridge Co.

City National Bank, Long Beach, Cal., 600 tons reinforced concrete substituted for structural steel.

Municipal power plant, Lansing, Mich., 1170 tons, to American Bridge Co.

Pending business includes:

London Guarantee & Assurance Co. building, Chicago 2400 tons; Alfred S. Alschuler, architect.

The mill quotation on plain material ranges from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plain material, out of warehouse.

Plates.—There has been a noticeable expansion in buying during the past week. Not only have generous specifications been received from carbuilders, but numerous orders have come from widely distributed sources. Miscellaneous manufacturers who reduced their stocks to the vanishing point prior to the taking of inventory, are now buying for their immediate requirements. Jobbers are also commencing to replenish their stocks. In the opinion of the mills, a continuation of the buying movement now in its inception will result in the re-establishment of the old differential between plates, shapes and bars.

The ruling mill quotations range from 1.60c. to 1.70c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Old Material.—Except for purchases of short turnings by a local blast furnace, orders for cast scrap by two local foundries, and a moderate purchase of bushing by an iron mill, the market has been practically devoid of consumptive buying. The price situation is unchanged except for a decline in heavy melting and allied grades and a slight advance in No. 1 bushing. Railroad lists include the Pennsylvania, Central Region, 1100 tons, and the Michigan Central a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails.....	\$16.00 to \$16.50
Relaying rails.....	20.00 to 25.00
Cast iron car wheels.....	15.00 to 15.50
Roller or forged steel car wheels.....	13.00 to 13.50
Steel rails, rerolling.....	12.00 to 12.50
Steel rails, less than 3 ft.....	12.50 to 13.00
Heavy melting steel.....	11.25 to 11.75
Props, switches and guards cut apart.....	11.25 to 11.75
Shoveling steel.....	10.75 to 11.25
Low phos. heavy melting steel.....	13.50 to 14.00
Drop forge flashings.....	7.50 to 8.00
Hydraulic compressed sheet.....	7.50 to 8.00
Axle turnings.....	8.50 to 9.00

Per Net Ton	
Iron angles and splice bars.....	14.00 to 14.50
Steel angle bars.....	10.50 to 11.00
Iron arch bars and transoms.....	15.00 to 15.50
Iron car axles.....	10.50 to 20.00
Steel car axles.....	12.50 to 13.00
No. 1 bushing.....	8.50 to 9.00
No. 2 bushing.....	6.00 to 6.50
Cut forge.....	10.00 to 10.50
Pipes and flues.....	6.50 to 7.00
No. 1 railroad wrought.....	10.50 to 11.00
No. 2 railroad wrought.....	10.00 to 10.50
Steel knuckles and couplers.....	11.25 to 11.75
Coil springs.....	12.50 to 13.00
No. 1 machinery cast.....	13.00 to 13.50
No. 1 railroad cast.....	12.50 to 13.00
Low phos. punchings.....	11.00 to 11.50
Locomotive tires, smooth.....	9.50 to 10.00
Machine shop turnings.....	4.50 to 5.00
Cast borings.....	6.00 to 6.50
Stove plate.....	12.00 to 12.50
Grate bars.....	10.50 to 11.00
Brake shoes.....	10.50 to 11.00
Railroad malleable.....	11.25 to 11.75
Agricultural malleable.....	11.25 to 11.75

New York

NEW YORK, Jan. 31.

Pig Iron. The market has been entwined by inquiries amounting to about 12,000 tons, principally from radiator and other house heating companies. A company at Dover, N. J., is in the market for 5000 tons and another New Jersey heating concern is inquiring for second quarter without naming any definite tonnage. A considerable number of inquiries for moderate tonnages have been received and on the whole conditions are more encouraging. In eastern Pennsylvania, \$20 for No. 2 plain seems to be the minimum, but in the Buffalo district concessions are being freely granted. Reports indicate that \$18.50 Buffalo can be done on No. 2. On the contracts for the tunnel segments, most foundries are figuring on a basis of \$20. furnace, for No. 2 plain, eastern Pennsylvania.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25.....	\$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	23.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	22.52
Buffalo, sil. 1.75 to 2.25.....	24.96
No. 2 Virginia, sil. 1.75 to 2.25.....	28.16

Ferroalloys.—Demand for ferromanganese continues to be confined to carload and small lots for early delivery and there have been sales at \$58.35, seaboard. The spiegeleisen market is fairly active so far as small lots are concerned, sales in the week having amounted to 200 tons at prevailing quotations. It is reported that two cargoes of Russian manganese ore, probably Caucasian, will soon be shipped to this country, one sailing in February and the other in March, each containing 5000 and 6000 tons respectively. It is understood that 23.50c. per unit, seaboard, has been refused and that 25c. is being asked. A movement seems to be on to get ore into this country before any possible tariff is ordered by Congress. The 50 per cent ferrosilicon market is quiet and sales are confined to carload lots

and small lots for delivery at prevailing quotations. One seller refuses to make any contracts for 1922 delivery.

Following are prevailing quotations:

Ferrous Alloys	
Ferromanganese, domestic, seaboard, per ton.	\$58.35
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegel Eisen, 20 per cent, furnace, per ton.	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton.	\$55.00 to \$60.00
Ferrotungsten, per lb. of contained metal.	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon 60 to 70 per cent Cr., per lb. Cr., delivered.	13c. to 14c.
Ferrovandium per lb. of contained vanadium	\$4.00
Ferrocobaltitanium, 15 to 18 per cent, net ton	\$200.00
Ferrocobaltitanium, 15 to 18 per cent, 1 ton to carloads, per ton.	\$220.00
Ferrocobaltitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	\$250.00
Ores	
Manganese ore, foreign, per unit, seaboard.	22c. to 25c.
Tungsten ore, per unit, in 60 per cent concentrates	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.	\$25.00 to \$27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York	50c. to 60c.

Finished Iron and Steel.—Most of the current activity locally is in structural steel. The largest contract of the week was 8000 tons for the addition to the department store of R. H. Macy & Co., New York, which will be fabricated by the Levering & Garrigues Co. The American Bridge Co. will fabricate the third section of the new Standard Oil Co. building. Other jobs which have been let during the week bring the total up to 16,500 tons. Bids have gone in during the week on considerable tonnage. New work for which contracts have been let follow:

Addition to store of R. H. Macy & Co., New York, 8000 tons, to Levering & Garrigues Co.

Section of Standard Oil Co. building, 4500 tons, to American Bridge Co.

Apartment house for Joseph Paterno, New York, 700 tons, to Paterson Bridge Co.

Apartment house for Andrew Campagna, New York, 1200 tons, to Paterson Bridge Co.

Bridge at Annapolis, Md., 700 tons, to Phoenix Iron Works Co.

Factory at Bloomfield, N. J., for American Book Co., 300 tons, to Shoemaker-Satterthwaite Bridge Co.

Machine shop for Florence Iron Works, Philadelphia, 200 tons, to Levering & Garrigues Co.

Two school houses in Brooklyn and Manhattan boroughs, 700 tons each.

Bridge for City of Philadelphia, 200 tons, to American Bridge Co.

New work on which bids have gone in follow:

Mkt building for William Skinner & Sons, Holyoke, Mass., 300 tons

Recreation building for Clark Thread Co., Newark, 350 tons.

Store at Richmond, Va., 400 tons; has been up once before for bids

Manufacturing building for Bancroft & Sons, Reading, Pa., 800 tons

Apartment house, Newark, 800 tons

15 to 20 tanks of 55,000-hbl capacity for the Mexican Petroleum Co. to be erected at Carteret, N. J., 3500 to 4000 tons.

Junior high school at Elizabeth, N. J., 600 tons

Union Memorial Hospital, Baltimore, Md., 900 tons

Reports of local sales offices for January will show only a slight improvement over December, while some companies report no improvement whatever. Those companies which make a varied line of products, including the lighter forms of steel, have fared much better than those making chiefly plates, shapes and bars. The lines which have enjoyed the best demand are sheets, tin plate, wire products and pipe. Jobbers have completed inventories and are buying in a small way for sorting up stocks. An oil company last week bought 400 tons of line pipe. Interest in plates is chiefly for oil tank work. Prices of most products are weak. Instances have been noted of plates selling in lots of not more than 100 tons at 1.40c., Pittsburgh. Railroads have been able to buy at this price from some mills for repair work. Prices generally quoted on plates, shapes and bars range from 1.45c. to 1.50c., Pittsburgh, but mills are frequently willing to shade

their quoted prices when an order is really in sight. Car builders and other users of steel are estimating their work on a 1.40c. basis. Sales of plates below 1.40c., Pittsburgh, are reported, but are not confirmed. The Lehigh Valley Railroad's orders for car repairs were divided as follows: Pressed Steel Car Co., 200; Buffalo Steel Car Co., 100; Lehigh Structural Steel Co., 100; American Car & Foundry Co., 500; Standard Steel Car Co., 350.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.83c. to 1.88c.; plates, 1.83c. to 1.88c.; structural shapes, 1.83c. to 1.88c.; bar iron, 1.83c. to 1.88c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—The market is pervaded by a general feeling of optimism. Prices are firmer and there is a slightly greater volume of inquiries in hand than at this time a year ago. We quote per net ton, f. o. b., New York, carload lots, as follows: 6-in. and larger \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Coke.—The coke market is showing more activity. At least one producer of by-product coke has made a quotation on the coke necessary for foundry use in making the castings for the New York-New Jersey tunnel. By-product coke is quoted at \$8.59, New Jersey points.

Old Material.—Although buying prices show a slight increase and there is some activity in small tonnages by mills in the Pittsburgh and other districts, dealers do not consider the present change as a permanent improvement or as setting the market at a higher level than the past few weeks. The market is fairly well established at \$8.50 per ton on heavy melting steel, based largely on buying during the past week by the Cambria Steel Co., which contracted for delivery to Johnstown, Pa., on a tonnage of No. 1 heavy melting steel at \$13.50 delivered, figuring back to about \$8.60 per ton, New York. The Worth Steel Co. and the Alan Wood Iron & Steel Co., have also contracted for small tonnages of No. 1 heavy melting steel, charging box size. Mixed borings and turnings are slightly higher, \$4.50 to \$5.00 being a fair range of quotations by dealers in the market for this material. In fact, one broker asserts that, if necessary, he might go as high as \$5.25 per ton in buying.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.	\$8.00 to \$8.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rolling rails	9.50 to 10.00
Relaying rails, nominal.	27.00 to 28.00
Steel car axles	10.00 to 10.50
Iron car axles	18.50 to 19.00
No. 1 railroad wrought.	10.00 to 10.50
Wrought iron track.	8.50 to 9.00
Forge fire	5.00 to 5.50
No. 1 yard wrought, long.	9.00 to 9.50
Cast borings (clean)	7.00 to 7.50
Machine-shop turnings	4.00 to 5.00
Mixed borings and turnings.	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long).	7.25 to 7.75
Store plate	10.00 to 10.50
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 8.50
Car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.	\$16.50 to \$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Warehouse Business.—The second half of January was slightly better than the business done during the first two weeks, but the month's average in a majority of cases was scarcely better than December, an extremely poor month for business. There is some shading of prices on certain items and sheets are particularly weak. Galvanized continues to be quoted at 4.75c. per lb., base, which is an asking price, any reasonable order bringing out a lower quotation from some dealer, who is overstocked. Black sheets, too, are being shaded slightly, although generally they are stronger than the galvanized sheet market. Spring steel market is unchanged from the standpoint of warehouse prices, but recent rumors of concessions in price by

mills may affect warehouse prices. The brass and copper market is unchanged. Dealers in pipe are, as a rule, submitting quotations for furnishing the pipe included in the contract for the vehicular tunnel under the Hudson River. This is about the only large contract stirring in this market. Some iron and steel warehouses have been offered stocks of imported material; one offer was of horse shoe nails; another of high carbon Swedish tool steel, the latter being held in stock in England. We quote prices on page 393.

High Speed Steel.—Quotations are generally unchanged. One producer has reduced his quotation on 18 per cent tungsten high speed steel from 90c to 85c. per lb. On the whole, prices on this grade now range from 85c. to 90c. per lb. with special brands of some companies quoted up as high as \$1.05 per lb.

Cleveland

CLEVELAND, Jan. 30.

Iron Ore.—Some increase in mine operations is reported. Oglebay, Norton & Co. have started to operate their Berkshire mine in the Iron River, Mich., district Menominee range, one shift six days per week, an increase from one shift three days per week, and have reduced wages to the same basis recently placed in effect by the McKinney Steel Co. in that district. This scale is \$2.10 per day for common labor and \$3 per day for miners. The Charcoal Iron Co. of America has resumed full operations at its Yale mine in the Gogebic range. On Jan. 1 there was approximately 27,450,000 tons of Lake Superior ore on hand at interior, Eastern and lake front furnaces, making a total of 35,895,000 tons on hand at both furnaces and docks on that date. This compares with approximately 38,050,000 tons on hand at furnaces and Lake Erie docks on Jan. 1 last year. Lake Superior ore consumed by furnaces during December amounted to 2,577,000 tons as compared with 2,188,000 tons during November.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.15; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—There is a steady but rather light demand for foundry iron in small lots for prompt shipment. Very few inquiries are being made for iron in extended deliveries, although some orders are for deliveries over a 60-day period. The largest sale reported is a 1000-ton lot of low silicon iron classed as No. 3 that was sold by a Valley interest to a Pittsburgh broker at \$18.50. One lake furnace reports sales aggregating 3000 tons during the week including one 500-ton lot placed by an Ohio foundry. Other sales range from around 200 tons down to car lots. Prices on No. 2 foundry iron continue to range from \$19 to \$20, lake furnace, with the lower price the more general quotation. Valley furnaces are quoting this grade at \$19.50. However, there are reports of quotations as low as \$18.50 on foundry iron. In some cases furnaces having contracts for high priced iron have shaded the \$19 price, the buyer taking part of the iron on his high priced contract and the remainder at the new contract price and it may be only in deals of this kind that quotations have gone below \$19. Shipments are fair, showing a little improvement. Low phosphorus iron is weak. A two-carlot sale of copper free iron being made at \$32, Valley furnace, a reduction of \$1 a ton. Report indicates that Eastern furnaces are naming low prices to Western consumers on copper bearing low phosphorus iron, buyers claim to have quotations as low as \$26 to \$26.50. We note the sale of 250 tons of Southern iron to a Pittsburgh district sanitary interest at \$16, which appears to be the minimum quotation in this territory. A few carlot sales of Ohio silvery iron were made during the week at scheduled prices.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	.....	\$19.86
Northern No. 2 fdy., sil. 1.75 to 2.25	.....	\$19.00 to 20.00
Southern fdy., sil. 1.75 to 2.25	.....	22.47
Ohio silvery, sil. 8 per cent	.....	32.88
Standard low phos., Valley furnace	.....	32.00

Semi-Finished Steel.—Slabs are weak. Quotations for Cleveland delivery are reported that would figure back to about \$24 at mill and should compel Youngstown mills to quote about \$26 to meet this competition. While Youngstown mills might quote about \$28, they are not inclined to name a lower price.

Finished Material.—Orders and inquiries for finished material show some improvement over the previous week, but buying is still almost wholly in small lots and consumers are not inclined to cover for more than their immediate requirements. Steel bars are in better demand than plates and structural material, although recent tank orders have resulted in some good plate business. The Warren City Tank & Boiler Co. has placed 1400 tons of plates for tanks for the Tidewater Oil Co. at Bayonne, N. J., and the Phoenix Iron Co., Meadville, has placed 3000 tons of plates for oil tanks for the Sinclair Oil Co. The price situation shows little change. On steel bars, plates and shapes prices are apparently firm at 1.50c, for carlots, but this price can be shaded \$1 or \$2 a ton on round lots. While there are rumors of prices lower than 1.40c., there is no confirmation of these reports which appear unfounded. The structural outlook has improved. The National Cash Register Co., Dayton, Ohio, has taken bids for a theater building requiring 250 tons and two new inquiries have come out for steel for manufacturing plants, one for 900 tons and the other for 1500 tons. The Cleveland Railway Co. is inquiring for 5500 street car wheels. Orders for four lake boats of Welland Canal size, two 235 ft. long, are reported to have been placed by the George Hall Coal Co., Ltd., of Montreal, to Frazer-Brace & Co. of Montreal to be built at the yards of the Tidewater Ship Building Co. at Three Rivers, Quebec, which were recently taken over by Frazer-Brace & Co. Boat inquiries recently received by American ship yards have not yet resulted in orders.

Jobbers quote steel bars, 2.36c; plates and structural shapes 2.16c; No. 9 galvanized wire 3.25c; No. 9 annealed wire, 2.75c; No. 28 black sheets 3.75c; No. 28 galvanized sheets, 4.75c; No. 16 blue annealed sheets, 3.10c; hoops and bands, 2.96c; cold rolled rounds, 3.25c; flats, squares and hexagons, 3.75c.

Sheets.—Blue annealed sheets in No. 12 and heavier gauges are weak owing to the competition of plate mills, some of which are quoting these sheets on a 1.75c plate basis, making the price 2.10c. for No. 10 and there are fairly well authenticated reports that the 1.50c. plate base has been used, making a 1.80c. blue annealed price. Prices on lighter gauges are firm, while regular prices on black and galvanized sheets are apparently being held, there are reports that some mills are using a Youngstown instead of a Pittsburgh basing point in making quotations. Consumers are buying only for early requirements.

Bolts, Nuts and Rivets.—The improvement noted early in the month continues and makers are getting a moderate volume of small orders, largely from jobbers. Local makers show no disposition to shade prices. Rivets are dull. January has been a disappointing month with the rivet makers, as the improvement in orders early in the month has not been maintained the past two weeks. Prices are irregular, the recognized market quotations of 2.25c. for structural rivets and 2.35c. for boiler rivets being shaded even on small orders.

Coke.—Two producers have advanced prices on foundry coke 25c. a ton to \$4.25, but other makers continue to quote standard Connellsville foundry coke at \$4 per ton. There is still a fair volume of carlot orders.

Old Material.—The market is quiet, but prices are firm. Activity at present is dull in blast furnace scrap and prices on these grades have advanced. Some dealers are offering \$9 at shipping point for machine shop turnings and a local consumer paid \$10 for a small lot of high quality. Owing to limited plant operations, the supply of borings and turnings is not plentiful. No mills have come in the market and trading is virtually all between dealers who are buying to cover on short sales. There is some demand from Youngstown dealers for open hearth scrap. Dealers' prices for Youngstown

delivery are \$14 to \$14.25 for heavy melting steel and \$12 for compressed steel scrap.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$12.00 to \$12.50
Steel rails, under 3 ft.....	12.50 to 13.00
Steel rails, rerolling.....	14.00 to 14.50
Iron rails.....	12.00 to 12.50
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	13.00 to 13.50
Cast borings.....	8.75 to 9.00
Machine shop turnings.....	8.75 to 9.00
Mixed borings and short turnings.....	8.75 to 9.00
Compressed steel.....	9.00 to 9.50
Railroad wrought.....	12.00 to 12.50
Railroad malleable.....	12.50 to 13.00
Light bundled sheet stampings.....	6.00 to 7.00
Steel axle turnings.....	9.00 to 10.00
No. 1 cast.....	15.00 to 16.00
No. 1 bushing.....	8.25 to 8.75
Drop forge flashings, over 10 in.....	7.50 to 8.00
Drop forge flashings, under 10 in.....	7.50 to 8.00
Railroad grate bars.....	12.75 to 13.00
Stove plate.....	13.00 to 13.25
Pipes and flues.....	8.50 to 9.00

Cincinnati

CINCINNATI, Jan. 31.

Pig Iron.—Several fair-sized tonnages were sold during the week, the most important of which was undoubtedly one of 500 tons of Southern iron taken by a local melter. This iron was sold on the basis of \$15.50, Birmingham. The specification called for an average silicon content of 2.25 and the entire tonnage was booked at \$16, Birmingham, or \$20.50 delivered. It is said that a slightly lower quotation was made on this business but that the analysis did not entirely meet requirements. At least one furnace quoted \$15.50 on base iron, with a 50c. differential for the higher silicon required to bring up the average. Several other round lots of Southern iron were disposed of, one lot of 600 tons going to an Indiana melter on a \$16 base price and another similar tonnage to a melter in Illinois at the same figure. It is reported that a Kentucky melter had purchased 400 tons on the basis of \$15, Birmingham, but this cannot be confirmed. A sale of charcoal iron is also reported to a car wheel maker, the price figuring back to a \$26, Lake Superior basis. On Northern iron, while \$19 is apparently the minimum of the Chicago furnaces, brokers are offering iron at \$18.75 and a lake furnace is reported to be booking business at \$18.50 for silicon up to 3.25 per cent. Included in sales of Northern iron was one of 1000 tons to a Michigan melter and 200 tons of high phosphorus to a Cleveland district melter. A Northern Ohio melter also bought 1000 tons of fluorspar. There was little activity in southern Ohio irons and furnaces are holding firmly to the \$19.50 to \$20 range. This price also applies to malleable as was evidenced by a quotation on a 200-ton inquiry from a northern Ohio implement manufacturer. There are very few inquiries current, one from Dayton being for 200 tons of Northern and a local melter being in the market for five cars of special analysis. Several 100-ton inquiries are also current as well as a number of carload lots, all indicating that the market is showing a little more activity than heretofore. An inquiry for a Southern pipe company is for 6000 tons, delivery to be made during the second quarter.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$20.00 to \$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	20.50 to 21.00
Ohio silvery, 8 per cent sil.....	\$2.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	22.02 to 22.52
Basic, Northern.....	21.02
Malleable.....	22.02 to 22.52

Finished Material.—With the exception of an order for 450 tons of bars taken from a railroad company, business during the week was rather quiet. The Big Four Railroad is taking bids on several hundred tons of axles, and inquiries are also out for small tonnages of bars, shapes, plates and sheets. A slightly weaker tone is noticed on prices of bars, shapes and plates, it being reported that 1.45c. can now be done on carloads with 1.40c. on a fair tonnage. It is reported that the L. & N. railroad has closed for 3500 tons of aplice bars, the order going to a Chicago mill. Sheet prices are holding very firmly at 3c. and 4c. for black and galvanized respectively, while on blue annealed

quotations are fairly steady at 2.25c. There is very little new activity in the structural field. Plans have been posted for the Business Men's Club in Cincinnati, in which 150 tons of steel are involved. U. S. Government Engineers are inquiring for three steel derricks for Louisville and another proposition to come up shortly will be a Federal Reserve Bank at Nashville, Tenn. Much interest is being shown in the Belknap Hardware Co.'s warehouse at Louisville, bids for which were opened in Chicago on Jan. 30. This is one of the largest jobs that has come up for some time. The U. S. Engineers' Office, Galveston, Texas, will receive bids until Feb. 23 for furnishing and delivering several 2000-barrel steel oil barges. There have been no lettings of consequence although the steel work on the Elk's Temple at Cincinnati has been awarded to the General Iron Works Co. at their bid of \$34,000. There has been a fair demand for wire products during the week, mostly coming from Southern districts. An improvement also is shown in wire nails which are now being regularly quoted at \$2.50 mill.

Warehouse Business.—Local jobbers report a fair demand for wire products during the week, but other lines continue rather quiet. Warehouse business is spotty, but orders are becoming a little more numerous and for heavier tonnages. It is expected that with increased manufacturing activities in the metal working field, which now seems possible, jobbers' business will show a steady improvement.

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c. No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 23 galvanized sheets, 5.25c.; wire nails, \$3.00 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Tool Steel.—A slight improvement is noted in the demand for tool steels and several fair sized orders were booked during the week. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 85c. per lb.

Coke.—There are signs of greater activity in the coke market, and melters are now preparing to accumulate a stock in anticipation of a coal strike on April 1. One inquiry for furnace coke for February and March shipment calls for 4000 tons a month. There is still a fair amount of contracting going on and as regards prices they have a much firmer tendency. This is true particularly of furnace coke, which has been quoted by some operators at \$3.25, Connellsville. Connellsville foundry coke is quoted at \$3.75 to \$4.50, New River foundry at \$7 to \$7.50 and Wise County at \$5 to \$5.50. By-product producers are on a \$6, Connellsville base.

Old Material.—There is very little activity in the local scrap market, but some sales are reported in the Chicago and St. Louis district. A sale of three cars of borings and turnings for Southern shipment is reported at \$13, delivered. The Big Four Railroad Tuesday closed bids on 13,000 tons. Prices are unchanged.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton	
Bundled sheets.....	\$3.50 to 4.00	
Iron rails.....	12.00 to 12.50	
Relaying rails, 50 lb. and up.....	25.00 to 26.00	
Rerolling steel rails.....	10.50 to 11.00	
Heavy melting steel.....	9.00 to 9.50	
Steel rails for melting.....	9.00 to 9.50	
Car wheels.....	12.00 to 13.00	
	Per Net Ton	
No. 1 railroad wrought.....	8.50 to 9.50	
Cast borings.....	3.00 to 3.50	
Steel turnings.....	2.00 to 2.50	
Railroad cast.....	12.00 to 12.50	
No. 1 machinery.....	13.50 to 14.50	
Burnt scrap.....	7.50 to 8.00	
Iron axles.....	15.50 to 16.50	
Locomotive ties (smooth inside).....	9.50 to 10.00	
Pipes and flues.....	4.00 to 4.50	

George C. Jones and Robert M. Jones have organized the George C. Jones & Co., located at 505 Stambaugh Building, Youngstown, Ohio, dealers in refractories, ferroalloys, coal and coke. For the past 10 years George C. Jones was assistant superintendent of blast furnaces and the open-hearth department of the Youngstown Sheet & Tube Co. Robert M. Jones was a traveling salesman for the Republic Iron & Steel Co., out of its Philadelphia branch, for the past two and one-half years.

Boston

BOSTON, Jan. 31.

Pig Iron.—The Eastern Malleable Iron Co., Naugatuck, Conn., in connection with the New Jersey-New York vehicular tunnel segment requirements, is asking bids on 25,000 to 50,000 tons of iron, silicon 1.50 to 2.00, equal 1922 monthly or equal 1922-1923 monthly deliveries. The Gurney Heater Co., Framingham, Mass., and Saco Lowell Shops, Boston, inquiries remain open. A Providence, R. I., foundry wants 100 tons No. 2X first quarter or 300 tons second quarter iron. No other inquiries of importance have developed. A local stove maker this week bought 300 tons No. 2X Buffalo first quarter iron at \$18.50 furnace, and a Connecticut foundry 400 tons No. 2X eastern Pennsylvania first quarter at about \$24.50 delivered. Other sales reported concern car lots of eastern Pennsylvania at \$19.50 to \$20 furnace, Buffalo at \$19 to \$19.50 furnace, and Alabama at \$16 to \$17 furnace. One car Alabama, silicon 2.75 to 3.25, sold locally at \$24.67 dock, the water rate being \$7.67, in competition with eastern Pennsylvania and Buffalo. The Essex furnace, Port Henry, N. Y., will go out of blast when orders on books are filled unless pig iron prices advance before then. Buffalo pig iron costs \$20.60 to more than \$21 a ton to produce. On this basis losses ranging 70c. per ton and higher are taken on every ton sold in this territory, yet iron, any silicon, is offered as low as \$18.50. Eastern Pennsylvania furnaces selling at \$19.50 to \$20 furnace base also are taking losses in this territory. One round tonnage No. 2X eastern Pennsylvania iron sold recently to Worcester, Mass., interests at \$18.75 furnace, but that price cannot be applied to-day.

We quote delivered at common New England points as follows, having added to furnace prices \$1.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East Penn., silicon 2.25 to 2.75	\$24.06 to \$25.06
East Penn., silicon 1.75 to 2.25	23.56 to 24.56
Buffalo, silicon 2.25 to 2.75	23.96 to 24.46
Buffalo, silicon 1.75 to 2.25	23.96 to 24.96
Virginia, silicon 2.25 to 2.75	29.08 to 29.58
Virginia, silicon 1.75 to 2.25	28.58 to 29.08
Alabama, silicon 2.25 to 2.75	27.16 to 28.16
Alabama, silicon 1.75 to 2.25	26.66 to 27.66

Finished Material.—The New England Structural Co., Boston, is awarded 600 tons structural steel for a local Kresge building and 400 tons for an Everett, Mass., high school. Bids open this week on 150 tons for a Winter St., Boston job. Few bridge jobs involving 100 tons or more give indication of coming up within the next month or two, but office buildings, etc., tonnages of some importance are in the making. Mill representatives report three to five times more business booked in January than in December. Business is still far below normal, however. Individual orders involve small tonnages, mostly from manufacturers. Some buying by jobbers and structural steel firms for filling in stock purposes is noted. Steel bars recently sold in this territory at as low as 1.40c., Pittsburgh base, but business closed this week at 1.45c. and 1.50c.

Jobbers now quote. Soft steel bars, \$2.55½ per 100 lb. base; flats, \$3.05½; concrete bars, stock lengths, \$2.55½; structural angles and beams, \$2.65½; plates, \$2.65½ to \$2.53; tire steel, \$3.85 to \$4.25; open hearth spring steel, \$1.50; crucible spring steel, \$11.50; bands, \$3.15½ to \$3.53; hoop steel, \$3.15½; cold rolled steel, \$3.40 to \$3.90; toe calk steel, \$8; refined iron, \$2.55½ per 100 lb. base; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50.

Cast Iron Pipe.—The market on cast iron pipe is firmer than it has been before in months. Manufacturers are still quoting as heretofore, namely f. o. b. Boston and district, 3-in. at \$66.70; 4-in. at \$56.70; 6-in. and larger \$50.70, with \$4 differentials on class A and gas pipe. But they are adhering strictly to schedule prices on all sizes, whereas heretofore some wavering was noted on large tonnages. The Warren Foundry & Machine Co. has closed on 200 tons 6-in. to 12-in. pipe for Watertown, Mass., and 125 tons, same sizes, for Somerville, Mass. Bids were opened late yesterday afternoon by Portland, Me., on approximately 2200 tons 6-in. to 30-in. pipe and fittings, and an option on 1200 tons 10-in. and 12-in. pipe for de-

livery up to and including May datings. An award will probably be made this week. The Boston Elevated Railway Co. has purchased 50 tons 6-in. pipe. The firmer undertone of the market is based on the large amount of business already on the books of the manufacturers, as well as indications of a new high turnover record being hung up in 1922.

Warehouse Business.—From warehouse cold-rolled steel has been reduced 15c. per 100 lb., rounds from \$3.55 to \$3.40, and squares, flats and hexagons from \$4.05 to \$3.55. Otherwise prices remain as heretofore. The demand for iron and steel continues to expand, but very slowly. Quotations on wire nails still take a range, from \$3.50 to \$3.75 per keg base, but those on other kinds are more uniform. Competition for cap, set and machine screw business is keen, with quotations in favor of the buyer. Sheet zinc has declined another 1c. a lb. to 9½c. per lb. base, in large lots.

Old Material.—The market has grown inactive again. A Worcester, Mass., foundry this week bought No. 1 machinery cast at \$17.92 per gross ton delivered. The tonnage involved is small, however, and does not represent the real market. The available supply apparently is in the hands of one firm that refuses to sell at any such price. The narrow spread between pig iron and machinery cast prices limits New England foundry consumption of the latter. Pennsylvania mills, chemical works and a New Jersey manufacturer of a patented flooring are buyers of cast iron borings, which are firmer due to their scarcity. Parksburg Iron Co. buying of skeleton is reported as completed, and the American Steel & Wire Co., Worcester, apparently has covered heavy melting steel requirements. Pennsylvania mills bid \$12 delivered for heavy melting steel. The freight is \$4.90, leaving \$7.10 f. o. b. New England shipping point, easily \$1 less than the lowest price reported by any dealer.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	\$18.00 to \$18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	15.00
Railroad malleable	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points.

No. 1 heavy melting steel	\$8.00 to \$9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe 11 in. diam. over 2 ft. long	7.00 to 7.25
Machine shop turnings	3.25 to 3.50
Cast iron borings rolling mill	7.25 to 7.50
Cast iron borings, chemical	8.25 to 8.50
Blast furnace borings and turnings	3.50 to 3.75
Forged scrap and banded skeleton	4.50 to 5.00
Street car axle and shafting	10.50 to 11.00
Car wheels	11.50 to 12.00
Revolving shafts	10.00 to 10.50

Buffalo

BUFFALO, Jan. 31.

Pig Iron.—Four furnaces are quoting \$19.50 base. One maker is not deviating from the policy not to sell under present conditions and is using the output of one furnace in blast for its own needs in other departments and supplying subsidiaries. The weaker market has not brought out business. One producer sold 1000 tons of foundry iron and another 5000 tons. Malleable is offered at \$19.50, but very little has been placed. The furnace banked by the Donner Steel Co., several weeks ago has not been placed in blast and basic iron requirements in the steel making division of the plant will determine the date of re-opening.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	\$20.00 to \$20.50
No. 2X foundry, 2.25 to 2.75 sil	19.50 to 20.00
No. 2 plain, 1.75 to 2.25 sil	19.00 to 19.50
Basic	18.25 to 18.50
Malleable	19.50
Lake Superior charcoal	31.75

Finished Iron and Steel.—Products which have not been in great demand in several months are being inquired for; bar and shape inquiry with one agency shows much improvement. Inquiry for the purpose of inventory computation is still coming in. Pipe and nail business has dropped off. Tin plate is steady and the demand is stable. A sheet buyer just outside Buffalo is asking prices on 500 tons of black sheets

and another inquiry is for 200 tons of black sheets. A Buffalo agency has sold 100 tons of corrugated sheets. The 1.45c. price on bars is more frequently heard and as low as 1.42½c. was quoted on an ordinary inquiry. Structural demand is poor; the only proposition of any magnitude now in prospect is the Niagara River bridge at Buffalo, but figures have not been asked, authority for the enterprise just having been granted.

Warehouse Business.—An improved demand in plates growing out of car work—both new and repair jobs—is evident the latter part of January. Other materials are quiet but sales organizations see prospective improvement in all lines in February.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 2.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold rolled round shafting, 3.40c.

Coke.—A prospective coal strike has served to cause improvement in the volume of inquiry. Best grades are freely quoted at \$4 ovens.

Old Material.—A price of \$14 on heavy melting steel is virtually in existence because of the failure of several dealers to release tonnages at \$13.50. One mill is in the market for any tonnage, but up to date has declined to pay more than \$13.50. Reports are current that the Steel Corporation is in the market for a considerable tonnage of steel, but dealers have not been approached here.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$13.00 to \$14.00
Low phosph., 9.01 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

St. Louis

ST. LOUIS, Jan. 31.

Pig Iron.—Buying of pig iron is still largely confined to carloads, of which there was a fairly good run during the last week. These orders are almost entirely for immediate shipment, with requests to trace through. While melters are short of stocks, they are buying only for immediate needs to fill such orders for their products as may be in hand. For the first time since the World War, Southern iron is offered in this market at a lower price than the Northern product. Offerings are being made of Southern iron by a large producer at the equivalent of \$15.20 Birmingham, or \$20.94 St. Louis. Northern iron at \$19 Chicago plus \$2.72½ freight would cost \$21.72½ here. But the lower price of Southern iron as made by this concern, which has a freight differential of 80c. a ton over producers in Birmingham proper, is not being met by other producers. Nor is the lower price having the effect of producing any business. Some concerns are selling Northern iron on a basis of \$20, Chicago, and Inland is out of the market for January and February. The Eighth Federal Reserve Bank gives widely varying reports from stove manufacturers, showing decreases of as much as 50 per cent to slight increases as compared with December a year ago. Farm implement manufacturers and distributors show heavy decreases from December, 1920, but fair gains over November. Radiator plants are working full time, and report to the bank a continued brisk demand for their products.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.85 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	\$21.725
Northern malleable, sil. 1.75 to 2.25	21.725
Basic	21.725
Southern foundry, sil. 1.75 to 2.25	21.74

Finished Iron and Steel.—While no tonnage of consequence is being purchased in any particular quarter, a fair amount of small orders is being placed for pipe for use in the oil fields of Oklahoma and at Mexia,

Tex. The structural demand is small here because of the failure of the union workers and employers and the building trades to get together. Bids will soon be opened on the Catholic orphanage at Alton, involving 200 to 300 tons of reinforcing bars, and the Jewish Hospital at Memphis, 125 tons of bars. New bids are to be asked on the auditorium and market house at Memphis, which likely will include revised plans, as previous bids were rejected because they exceeded the amount of the bond issue. The original plans called for 2500 tons of structural shapes and 500 tons of bars. Some wire nails are being sold, but the market price of \$2.50 Pittsburgh has failed to get the business. Railroad buying let up during the week, and no inquiries were issued.

For stock out of warehouse we quote: Soft steel bars, 2.62½c. per lb.; iron bars, 2.62½c.; structural shapes, 2.72½c.; tank plates, 2.72½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52½ per 100 lb.; boiler rivets, \$3.62½; tank rivets 7/16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-15 per cent; hot pressed nuts, square or hexagon blank, \$4; and tapped, \$3.75 off list.

Coke.—Sales of foundry coke are being made almost entirely on a carload basis. Consumers are still buying for immediate needs and for quick shipment. There is more of a tendency among producers to sell for no later delivery than March, and a few are making no quotations beyond February delivery, indicating their confidence in the market. There is a better demand for domestic coke because of colder weather.

Old Material.—The market for old material is materially weaker and prices have been marked down from 50c. to \$1 a ton on most grades. One of the large consumers last week took on a tonnage of heavy melting steel and is now out of the market. Other buyers of steel and rolling mill grades in the St. Louis district are absolutely out of the market, and cannot be tempted to purchase even a small tonnage except at bargain prices. Yard dealers are loaded down with material and are unable to stock additional tonnages. So they are compelled to dispose of old material being daily received from the railroads at a severe loss. Current railroad offerings include: Missouri, Kansas & Texas Railway, 1750 tons; Louisville & Nashville, 2500 tons; Pennsylvania System, Northwest region, 750 tons, and an open list issued by the Cleveland, Cincinnati, Chicago & St. Louis (Big Four).

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	\$14.00 to \$14.50
Steel rails, rerolling	10.50 to 11.00
Steel rails, less than 3 ft.	12.50 to 13.00
Rerolling rails, standard section	23.00 to 28.00
Cast iron car wheels	13.50 to 14.00
No. 1 heavy railroad melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.75 to 10.00
Ordinary shoveling steel	9.50 to 10.00
Frogs, switches and guards, cut apart	10.00 to 10.50
Ordinary bundle sheet	4.00 to 4.50
Cast steel bolsters	9.50 to 10.00

Per Net Ton	
Heavy axles and tire turnings	6.00 to 6.50
Iron angle bars	13.00 to 13.50
Steel angle bars	9.00 to 9.50
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
Wrought iron arch bars and trussoms	15.00 to 15.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealer's forge	8.00 to 8.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	8.50 to 9.00
No. 1 rollers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	11.00 to 11.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	5.50 to 6.00
Light railroad sheet	3.50 to 4.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	3.00 to 3.50
Country mixed iron	6.00 to 6.50
Uncut railroad mixed	7.00 to 7.50
Horseshoes	9.50 to 10.00
Railroad brake shoes	9.50 to 10.00

Pierce, Butler & Pierce Mfg. Corporation, maker of radiators and heating apparatus, is erecting a new cupola building and installing a new cupola and blower at its Huntingdon, Pa., plant.

Philadelphia

PHILADELPHIA, Jan. 31.

All steel products, with the possible exception of sheets, continue to show weakness in price. Plates are conspicuously weak and 1.40c., Pittsburgh, has become a common quotation on desirable tonnages. Shapes and bars are obtainable at 1.45c., while concrete bars have dropped below this figure. The \$4.75 price per base box on tin plate is no longer the market, as sales are being freely made at \$4.60, while as low as \$4.50 has been quoted. Wire nails are weak at \$2.50 and shading of \$1 to \$2 per keg has been freely reported. On export inquiries, prices considerably below the domestic level have been quoted. For example, on 10,000 tons of open-hearth rerolling billets for England \$25.50, Pittsburgh, was quoted, while on a few hundred tons of bars 1.30c., Pittsburgh, was named by a leading maker. Foundry pig iron prices continue firm, though a concession has been made on basic in a recent sale of 1000 tons.

Slowness of business to improve is generally attributed to uncertainty as to the freight rate decision. Few gains in production have been made in January. Eastern mills, in which plate rolling capacity is a large factor, are apparently no better off than they were at the beginning of the month.

Pig Iron.—Several large consumers are apparently making every effort to buy foundry iron at prices lower than furnaces in this district appear willing to quote. The furnaces are adhering rigidly to \$20, furnace, for No. 2 plain and \$20.50 for No. 2X. Three New England consumers whose inquiries aggregate 5000 tons have delayed buying for more than a week. Two New Jersey heater manufacturers have each inquired for 5000 tons. In one case second quarter delivery is specified and in the other, half is wanted in second quarter and the other half in third quarter. In the immediate Philadelphia territory there are few inquiries and none exceeding 300 tons. Several Eastern furnaces have given protective bids to foundries which are figuring on the cast iron segments for the New York-New Jersey vehicular tunnel. A method of overcoming the objection which has been raised to deliveries extending over two or three years is to bid on the iron for delivery within six months, the foundry to carry the iron in storage at its own expense or by obtaining bank credit over the remaining period of consumption. Two large steel interests which have iron foundries are said to be in an ideal position to cast the segments economically. In one instance the foundry of a subsidiary shipbuilding company would be utilized, while in the other plant pig iron would be available without cost of transportation, thus eliminating a cost item which may make a low bid possible. There is little interest in steel-making iron. A sale of 1000 tons of basic at \$19.84, delivered, is about 40c. a ton below the last reported transaction. A few hundred tons of copper bearing low phosphorus iron were sold last week at \$28, furnace. The high cost of making iron and the unsatisfactory condition of the market have caused the Thomas Iron Co. to blow out its Hellertown furnace, while for similar reasons Witherbee, Sherman & Co. are putting out their stack at Port Henry, N. Y. The Thomas Iron Co. still has the Alburts furnace in blast, but this may go out in a few weeks unless conditions improve materially. The Brooke furnace has changed from foundry iron to basic.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East Pa. No. 2 plain	1.75 to 2.25 sil.	\$20.81 to \$21.26
East. Pa. No. 2X	2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain	1.75 to 2.25 sil.	27.24 to 27.74
Virginia No. 2X	2.25 to 2.75 sil.	27.74 to 28.24
Basic delivery eastern Pa.		19.84
Gray forge		20.50 to 21.50
Malleable		23.00 to 24.00
Standard low phos. (f.o.b. furnace)		30.00
Copper bearing low phos. (f.o.b. furnace)		28.00

Billets.—Philadelphia exporters have quoted on two lots of billets for England, one of 10,000 tons and another of 2000 tons. Sheet bars are also wanted by England, but it is not certain that any of this business will come to the United States. Domestic demand for

rerolling billets is light, but the demand for forging quality is slightly improved. Prices range from \$28 to \$29 on rerolling and \$32 to \$33 on forging, f.o.b. Pittsburgh. On export inquiry \$25.50, Pittsburgh, has been quoted for rerolling, billets.

Ferroalloys.—There is little demand for ferromanganese, which is still quoted by all interests at \$58.25 seaboard. Spiegeleisen is held at \$25 to \$27, furnace.

Plates.—Plates continue the most unsatisfactory of any of the steel products as to both demand and prices. It now appears easy to obtain quotations of 1.40c., Pittsburgh, on attractive lots, while 1.45c. is the ruling quotation on smaller lots. Most buyers do not seem interested in the 1.50c. quotation still adhered to by some mills, though some business is being booked at this price. An Eastern shipbuilding company bought about 200 tons of plates at 1.40c., Pittsburgh, while another shipbuilding company, which is figuring on tunnel shields for the New York-New Jersey vehicular tube, is reported to have received protection at 1.40c., Pittsburgh, on 10,000 tons. The Pusey & Jones shipyard at Wilmington will build two passenger boats for the Old Dominion Line, which will require a small tonnage of plates, shapes and bars, and the Sun Shipbuilding Co., Chester, is expected to build five barges for the Erie Canal. Bids are being taken on a number of other ships, but there is nothing definite yet as to whether the work will go ahead. Eastern mills have made no appreciable gain in operations in January. Chief sources of business are fabricators of oil tanks and marine boilers, while some orders, notably one of 100 tons, are being received from railroads for car repair work. We quote plates at 1.40c. to 1.50c., Pittsburgh.

Structural Material.—A gain in bookings of structural shapes is noted by some mills, but very little business is developing in the immediate Philadelphia district. Plain material is obtainable from 1.45c. to 1.50c., Pittsburgh. On especially attractive tonnage, the lower figure has been shaded.

Bars.—No marked improvement in the demand for steel bars is noted, though jobbers are buying a bit more freely. Eastern mills have quoted on 1700 tons for a pier at Seattle, Wash., and about 2000 tons will be required for a hardware warehouse at Louisville, Ky. Bar iron makers quote 1.45c., Pittsburgh, but this is frequently shaded to 1.40c.

Sheets.—For Eastern shipment, Youngstown mills are frequently quoting f.o.b. Youngstown instead of Pittsburgh. Otherwise sheet prices appear to be firm at 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh.

Rivets.—The Merchant Shipbuilding Co., Chester, is inquiring for 500 tons of special quality rivets for fabricating pipe for the New York aqueduct.

Warehouse Business.—Prices are unchanged, and for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.75c.; ½-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.10c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron 5c.; tool steel, 4.50c.

Coke.—Furnace coke prices stiffened somewhat today, and it is now difficult to buy either for prompt shipment or on contract at less than \$3.25, Connellsville. Foundry coke is quoted from \$4 to \$4.50, ovens, according to quality.

Old Material.—The Alan Wood, Iron & Steel Co. last week bought 2500 tons of steel from a New York dealer at \$12.50, delivered. A Delaware steel maker is offering \$12. Another Eastern mill has paid \$12.50 at its plant. A steel company has sold 1000 tons of low phosphorus plate scrap at \$17.50, f.o.b. its mill. The United States Shipping Board will take bids up to noon on Feb. 15 on 105,000 tons of steel at the Hog Island shipyard. This material was bid on before but

was considered solely as scrap and the bids were rejected. We quote various grades of old material for delivery at consumers' works in this district as follows:

No. 1 heavy melting steel.....	\$12.00 to \$12.50
Scrap rail.....	13.00 to 12.50
Steel rails, rerolling.....	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under.....	18.00 to 19.00
Car wheels.....	16.50 to 17.00
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.00 to 12.50
No. 1 large fire.....	10.00 to 10.50
Bundled sheets (for steel works).....	9.50 to 10.00
No. 1 busheling.....	11.00 to 12.00
No. 2 busheling.....	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use).....	9.25 to 10.25
Mixed borings and turnings (for blast furnace use).....	9.25 to 10.25
Machine-shop turnings (for rolling mill and steel works use).....	8.00 to 9.50
Heavy axle turnings (or equivalent).....	9.50 to 10.00
Cast borings (for steel works and rolling mills).....	12.00 to 12.50
Cast boring (for chemical plants).....	13.50 to 14.00
No. 1 cast.....	16.50 to 17.00
Railroad grade bars.....	14.00 to 14.50
Stove plate (for steel plant use).....	11.00 to 11.50
Railroad radiable.....	13.00 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications).....	12.00 to 12.50
Iron car axles.....	No market
Steel car axles.....	17.00 to 18.00

Birmingham

BIRMINGHAM, ALA., Jan. 31.

Pig Iron. Iron makers of Birmingham express conviction that the market is stronger than it has been in some time. Surface indications point that way. If Sheffield iron is quoted under Birmingham iron the 40c. to 80c. freight differential in favor of Sheffield must be considered. It is a district to itself. One Sloss-Sheffield stack is in operation there. The base at Birmingham is \$16. Among transactions of the week were two 500-ton lots for Southern consumption and one of 500 to 700 tons for the Pacific Coast. These went at \$16. Pacific Coast business is helped by low rates via ship out of Mobile. Bookings were more widely scattered over competitive territory than in many weeks. Two lots went to northern Michigan, one to a northern Ohio stove maker, several others into Illinois and Ohio. The Pacific Coast took two car lots besides the 500 to 700-ton lot. A lot of 750 tons leaves Mobile for Pacific Coast this week and a similar amount has been booked for February sailing. Texas took several lots and the Carolinas were again in the market. The leading interest is credited with having booked 10,000 tons for the leading pipe interest some time ago. Total business for the week seems to have been about 6,000 tons. The Woodward Iron Co. banked a stack about Jan. 20, but it is to resume this week. The company has been operating three merchant stacks several months. Steel and iron men attending the commission hearings in Washington held conferences while there with executives of Southern railroad systems regarding freight rates and report a very receptive mood on part of the executives with reference to some initiative on their part to reduce rates so as to enable Birmingham iron to get further afield and give the makers business.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$16.00
Basic.....	15.00
Charcoal, with blast.....	32.00

Cast Iron Pipe. High pressure base remains at \$33 with quotations up and down. The base of standard sanitary is at \$37, extra heavy \$28. The Pacific Coast took a total of 7000 to 8000 tons, half and half, of high pressure and sanitary pipe in January, and 12,000 to 15,000 tons of same, two-thirds high pressure and one-third sanitary, in December, a total of approximately 20,000 tons in the two months. At least three makers of each class of pipe participated. The United States Cast Iron Pipe Foundry Co. has begun the installation of five De Lavaud centrifugal pipe casting machines in the North Birmingham plant.

Coal and Coke.—Coke has weakened to a base of \$5 to \$5.25. The Federal coal terminal at Mobile will be in operation next month. It has a capacity of

40,000 tons and is alongside the Federal fuel oil stations.

Finishing Mills.—The Tennessee company went to 66 2-3 per cent capacity in its open hearth department this week, operating six instead of five furnaces. Rail mill, car works and tie-plate plants are in continuous operation at normal. The Gulf States Steel Co. closed its open-hearth department, but has steel on hand for finishing mills. The blast furnace is to resume soon to replenish depleted iron stocks. Operations are around 60 per cent.

Old Material.—Scrap dealers are buying from one another. There is no other business. Reduced freight rates can alone enable other than district business.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails.....	\$11.00 to \$12.00
No. 1 steel.....	10.00 to 11.00
No. 1 cast.....	14.00 to 15.00
Car wheels.....	13.00 to 14.00
Tramcar wheels.....	12.00 to 13.00
No. 1 wrought.....	12.00 to 13.00
Stove plate.....	11.00 to 12.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	6.00 to 7.00

San Francisco

SAN FRANCISCO, Jan. 25.

Pig Iron.—The time has not yet come to report a recovery of buying in pig iron in the San Francisco market. Practically no new business of any note has been done since the first of the year, and the largest handlers apparently have nothing better than a small-lot routine turn-over. Foundry activity shows no perceptible improvement, although there is more confidence in the future. It is understood there is an inquiry for about 200 tons of iron here, and both Los Angeles and Tacoma are said to be in the market for 500 tons. Just recently the Conference rates from Gulf points to San Francisco were lowered from \$10.10 a short ton to \$8.36½, which will tend to reduce the differential between foreign materials and domestic. There has been no noticeable change in the price of pig iron, although probably there is a softening tendency.

Cast Iron Pipe.—Business has been better in pipe during the past week or two. Demand shows improvement both from municipal and private sources, it being said that one large fabricator has around 1000 tons from the latter. Portland receives bids on Jan. 30 for 2000 tons of 4 to 12-in. pipe. Santa Cruz, Cal., is in the market for 109 tons of 8-in. pipe and fittings, and Seal Beach is letting a contract on Jan. 26 for 230 tons of 4, 6, 8-in. pipe. It is reported that Schofield Barracks, Honolulu, will require 5 miles of 24 and 18-in. pipe. Bids are to open on March 9. Prices are in the neighborhood of \$31 base, and some are expecting an advance shortly.

Finished Iron and Steel.—Interest at present is centering on one project, the Harbor Commission's Islas Creek warehouse. The Healy-Tibbets Construction Co., San Francisco, has been appointed manager of general construction, but the contract for 800 tons of bars for the substructure has not yet been placed. It is this which is providing the interest. Competition among the local mills is very keen, perhaps because it is the only sizable prospect in view. During the past fortnight, improvement in demand has failed to materialize perceptibly. There is a little better feeling, but it has hardly taken definite form yet. A little export business is reported being done, and some replacement buying is keeping a semblance of life in the situation. As far as can be ascertained, prices are about steady, although slightly variant figures are occasionally heard.

Coke.—Business has been fair in this commodity of late. The Southern Pacific Co. placed 600 tons at a very low figure, and also has taken 500 tons of smelting coke for its West Oakland shops. More consignments of foreign material have arrived, totaling approximately 1100 tons. Inquiries are picking up, and buyers seem a little more disposed to take supplies, even though small. As in the case of pig iron, activity is checked by the prevailingly quiet demand.

for desired products. Two other lots, comprising 300 long tons and 550 long tons, are said to be en route to this port. The market price is around \$21, ex ship, San Francisco.

Old Material.—This is a routine market only. Movement is confined to the small daily needs of consumers, as foundries are operating in a very limited way. It is reported that there are only two open-

hearth furnaces operating in California at present, and rolling mills are on a hand-to-mouth basis. Perhaps the most interesting feature of the scrap situation is the offering of between 15,000 and 20,000 tons of railroad scrap of various grades, being placed on the market by the Southern Pacific Co. No disposition has yet been made. Prices on the regular scrap offerings are nominal at about the same levels.

THE ECONOMIC SITUATION

What the Individual Is Called On to Consider to Bring About Improvement

BY CHARLES A. CARPENTER*

If we assume that export trade cannot be expanded to give work to our unemployed, we must seek a domestic solution. It has been stated that unemployment is a local issue for our cities to settle individually. This is a grave mistake. If through war forces, population has shifted from one center to another, it should be evident that in a return to peaceful pursuits as great a shift is necessary. The securing of labor for war purposes was not a local issue and so the returning of ex-soldiers and munitions workers to peace time activities becomes the nation's problem.

Undoubtedly economic forces are working this out. As our excessive potential production capacity in any industry is unable to operate, labor drawn to that industry is compelled to seek other means of earning a living. Capital so invested may be dissipated or diverted. Out of a tangle of unemployed and business failures, we are slowly righting ourselves. Why shouldn't national aid be given to these forces? Why try to prolong the agony by ill advised legislation? We assuredly have men in the United States capable of directing the public thought in channels which would show many people the futility of sitting idly by waiting for some miraculous boom to help them out. Our ancestors hewed their way as pioneers and lived happily. We still have land unworked which will support many people.

We can hasten competition in industries seeking too great profit. We can deflate industries which are over-extended by tightening credit. We can frankly face the facts and bring true prosperity back right among ourselves. Then we can charitably aid other peoples solve their ills. When our labor and capital are redistributed in peaceful pursuits, we can size up the foreign situation and by admitting more imports through tariff adjustment, prevent over-expansion here. It is not too much to believe that the United States faces a great era of prosperity, provided selfish forces are curbed and wise leaders secured at this time.

Righting the Dislocation

Facing our present business pause and the lowered buying power due to reduced incomes, let us strive to find the least painful way out. Under current circumstances, business which is normal and essential for the country is suffering through causes beyond its control. The speculative ventures unfortunately do not get all the grief. The former are entitled to help—the latter should face the stern law of the survival of the fittest.

Candid publication of potential capacity, basic demand and present stocks on hand in various industries would turn the spotlight on the overcrowded lines.

War requires a great shifting of wealth and labor to fields which we hope are very temporary. In fact, they must be such, as war causes a reduction in our real wealth as a nation. Following a war this mis-directed capital and labor must be diverted back to normal. An orgy of extravagance cannot be called normal, as its effects in the final analysis are about the same as war.

We surely wish to progress in civilization. Our people should get proper food, clothing, sanitation, protection of life and property and some enjoyment. Is

it not possible to reawaken the pioneer spirit of old and get each and every one of us to resolve here and now to look to the finer things for true happiness? Let us create a demand for healthy life, the home, reasonable comfort and peace of mind, induced by having a little reserve for unusual conditions. Why not get away from the idea that wasting the efforts of mankind is generosity? Why not see that the waster, rich or poor, is tempting capital and labor into dangerous temporary fields and, therefore, it is against the best interests of the nation to encourage the profligate spender, whose trade is good when he has the money and who stops buying when he is "broke."

The world, as constituted to-day, furnishes mankind with a great abundance of things, making life worth while. There should be no danger of a shortage of necessities and there is ample opportunity for much luxury. As the individual progresses, it is only fair that additional comforts and pleasures should be obtained. The acquirement of these is the mainspring of human progress.

Consequently, the man of steady high income is within his ethical rights when he has a fine home, choice foods, good clothes, luxuries, etc. Provided he lives a life from year to year with similar demands, he is not causing wealth and labor to be misapplied. He has legitimately earned the right to some of nature's surplus, which the less successful or meritorious cannot have. It is also just that an individual who has not squandered his wealth should leave his surplus to others, so they may be given this earned share of the excess.

Time Alone the Cure

However, when an individual in times of exceptional prosperity for his particular enterprise or nation, recklessly spends his earnings, he is contributing to the dislocation of economic society. For a brief time he lives in luxury. When bad times come he has no reserve, his income is reduced and he ceases to buy. Reserve and surplus wealth have been dissipated, labor and capital induced to enter non-essential fields due to the lure of large profits, are left standing idle. Time alone can cure the trouble. Nature must be given a chance to re-establish her excess of good things.

Thus, in a general way we account for our periodic ups and downs. War is but an instance of abnormal waste. It would, therefore, seem reasonable to suppose that steady living within natural economic resources would prevent business depressions of the kind with which we are all familiar. We no doubt would still have ups and downs, as there is no guarantee from year to year that nature will always favor us, but the difference between good and bad times would be lessened materially.

Patriotism is as necessary now as it was during the war. The development of the old fashioned home, habits of thrift, and the will to work can be taught. Those who want too much can be curbed. A little altruism and leadership would soon bring us out of our present problem into a golden age of American history. When our acute problem is solved, desirable aliens, willing to be true Americans could be admitted to share our blessings, but we should keep out those who wish to exploit us, giving little or nothing in return. The United States should easily be the leading nation in the evolution of civilization following the world war and it is our duty to take our trust seriously so that the spirit of democracy successfully guiding this country in prosperity, shall be a beacon light to less fortunate peoples—leading them to a higher destiny in peaceful pursuits.

*Valley Forging Co., Verona, Pa.

THE IRON AGE

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery
Copper, New York* Straits Lead Zinc

	Lake	Electro	Tin New York	New York	St. Louis	New York	St. Louis
Jan.							
25	13.75	13.50	30.75	4.70	4.40	5.00	4.65
26	13.75	13.50	31.00	4.70	4.10	4.95	4.60
27	13.75	13.50	31.25	4.70	4.40	4.90	4.55
28	13.75	13.50		4.70	4.40	4.90	4.55
30	13.62½	13.37½	31.50	4.70	4.40	4.87½	4.52½
31	13.62½	13.37½	32.00	4.70	1.40	4.85	4.50

*Refinery quotation

New York

NEW YORK, Jan. 31

Copper and zinc are inactive and lower, while tin and lead have been bought fairly freely at steady prices.

Copper.—Despite the fact that large consumers bought heavily in the last quarter of last year and are specifying on contracts steadily each week, there has been enough inquiry from a few fairly large consumers, together with demand for small lots here and there, so that the temptation to sell on the part of some interests has been yielded to and the market for electrolytic copper is down to 13.62½c., delivered, or 13.37½c., refinery. At these levels some business has been done in quantities larger than small lots. Very little is heard of foreign demand, but it is understood that this is keeping up fairly well. Lake copper is slightly lower at 13.62½c., delivered.

Copper Averages.—The average price for Lake copper for the month of January, based on daily quotations in THE IRON AGE, is 13.81c. The average price of electrolytic copper is 13.55c., delivered or 13.30 c., refinery.

Tin.—Excepting last week Thursday, January 26, the market was dull and quiet, but on that day large sales of Straits tin were made, variously estimated at from 600 to 1000 tons. The latter figure is regarded by some as high because some sellers were buyers and others were not anxious to sell. The activity on the day referred to started in the morning with brisk inquiry which resulted in immediate business and by afternoon the market was in full swing and all reasonable offers were accepted. Dealers and importers were the principal buyers, but consumers were also among the purchasers. On the following day, Friday, the small advance in the London market was disappointing in view of the activity here the day before and the market turned dull and stagnant and has been so up to the present time. On Jan. 25 on the New York Metal Exchange 25 tons of Straits tin for May-June shipment was sold at 30.25c., and also 50 tons for delivery in 1922, at seller's option, was sold at 30c. To-day the market has been quiet and Straits tin is quoted at 32c., New York, while the London market advanced £2 per ton over yesterday's price, with spot standard quoted at £159 10s., future standard at £161 5s. and spot Straits at £161 10s., with the market active and strong. Interest centers in speculation as to deliveries into consumption in January, being variously estimated from 4000 to 4500 tons. Arrivals thus far this month have been 3910 tons, while the quantity afloat is reported at 6935 tons.

Lead.—Demand continues steady and prices are unchanged, with that of the leading interest at 4.70c., New York and St. Louis, and that of the independents at 4.40c., St. Louis and 4.70c. to 4.75c., New York and eastern points. In the opinion of one seller, if consumption continues at the present rate, scarcity of lead may develop unless production is increased.

Zinc.—This market continues lifeless and devoid of feature. Prices have declined almost daily and prime Western for early delivery is now quoted at 4.50c., St. Louis, or 4.85c., New York, a decline of 15 points in

the week. Sales are still confined to carload and 100-ton lots for immediate shipment, but these are by no means numerous.

Antimony.—Wholesale lots for early delivery are slightly easier at 4.40c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, continues to be quoted by the leading interest at 19c. to 19.10c. per lb. f. o. b. plant, depending on the quantity. Importers' metal of the same grade is obtainable at 17.50c. to 18.50c., New York, duty paid.

Old Metals.—Business is very quiet as a result of the discouraging conditions in the copper market. A few holders are inclined to lower prices while the others have faith in the ultimate rise in copper. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.00
Copper, heavy and wire.....	12.25
Copper, light and bottoms.....	9.75
Heavy machine composition.....	10.25
Brass, heavy.....	8.00
Brass, light.....	6.00
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy.....	4.25
Lead, tea.....	3.25
Zinc.....	3.00

Chicago

JAN. 31.—Efforts to sell in a reluctant market have resulted in further price declines in copper and zinc. Tin, however, has advanced. No changes in old metal prices are reported. We quote in carload lots: Lake copper, 13.50c.; tin, 33c.; lead, 4.50c.; spelter, 4.60c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 5.75c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

Jan. 31.—Lead for the week was slightly lower, while slab zinc was 10 points lower. We quote: Lead, 4.35c. to 4.40c., carlots; slab zinc, 4.65c. On old metals prices are: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

General Fireproofing Co. Loss

YOUNGSTOWN, OHIO, Jan. 31.—General Fireproofing Co. showed a loss of \$201,000 last year after an inventory shrinkage of \$285,000 and payment of \$97,500 in preferred dividends, but before common dividend. Gross sales were \$5,120,000 and average operations 60 per cent, share holders were informed at annual meeting.

The sale of tractors in Peru has been laboring under serious handicaps during the past year due to the adverse rates of exchange and to the general business depression, according to a report compiled by the Agricultural Implement Division, Department of Commerce. But few sales have been made in the past few months, resulting in the accumulation of considerable stocks. The American tractor has a practical monopoly of the market, as it was first introduced and is best known.

A directory of firms whose trade touches the United States, South America or Germany is to be issued shortly as Guia Aleman Americana. It will be in three languages, English, Spanish and German. The book will contain 1500 large pages and it is issued at \$6 by the Caxton Translations Institute, 47 Victoria Street, London, S. W. 1, England, whose agent in the United States is the Ford Corporation, 97 Broadway, New York.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic...	\$0.36	Kansas City	\$0.815
Philadelphia, export...	0.265	Kansas City (pipe)...	0.77
Baltimore, domestic...	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic...	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)...	1.115
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates...	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail...	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c per 100 lb on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c; ship plates, 75c; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c; sheets and tin plates, 60c to 75c; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretcher, 75c; pipe, not over 8 in. in diameter 75c, over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 8 to 15 in., channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 150c.

Sheared plates, 1/4 in. and heavier, tank quality, 150c

Wire Products

Wire nails, \$2.50 base per keg; galvanized 1 in. and longer, including large head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb. annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.15; galvanized fence staples \$3.15; painted barbed wire \$2.65; polished fence staples, \$2.65; cement-coated nails, per count keg, \$2.00. These prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are 68 to 70 1/2 per cent off list for carload lots, 67 to 69 1/2 per cent for 1000-rod lots, and 66 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7 1/2 per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, 1/2 in. x 6 in., 65, 10 and 5 to 70 and 10 per cent off list
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list

Cut threads 65 and 10 to 70 per cent off list || Longer and larger sizes | 65 and 10 to 70 per cent off list |
Lag bolts	70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads	60 and 10 per cent off list
Other style heads	20 per cent extra

Machine bolts, c.p.c. and t. nuts, 1/2 in. x 4 in., 65 and 5 per cent off list
Smaller and longer sizes 65 and 5 per cent off list || Hot pressed sq. or hex. blank nuts | \$5.50 off list |
Hot pressed nuts, tapped	\$5.00 to \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts	\$4.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped	\$5.00 off list
Semi-finished hex. nuts	

1/4 in. to 9/16 in. inclusive 80, 10 and 10 per cent off list || Small sizes S. A. E. | 80, 10, 10 and 10 per cent off list |
1/2 in. to 1 in. inclusive, U. S. S. and S. A. E.	70, 10, 10 and 10 per cent off list
Stove bolts in packages	80, 10 and 5 per cent off list
Stove bolts in bulk	80, 10 and 7 1/2 per cent off list
Tire bolts	65, 10 and 10 per cent off list
Track bolts, carloads	3c to 3 25c base
Track bolts, less than carloads	4c to 4 25c

Upset Square and Hex. Head Cap Screws

1/2 in. and under. 80 and 10 to 80, 10 and 10 per cent off list
5/16 in. to 3/4 in. 80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

1/2 in. and under 80, 10 and 5 to 85 per cent off list || 5/16 in. to 3/4 in. | 80, 10 and 5 to 85 per cent off list |

Milled Square and Hex. Cap Screws

All sizes 75 and 10 to 80 per cent off list |

Milled Set Screws

All sizes 75, 10 and 10 per cent off list |

Rivets

Large structural and ship rivets \$2.25 || Large boiler rivets | 2.55 |
| Small rivets | 70, 10 and 10 to 70, 10, 10 and 5 per cent off list |

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$37, chain rods, \$36 to \$37; screw stock rods, \$11 to \$12, rivet and bolt rods and other rods of that character \$36 to \$37, high carbon rods, \$43 to \$49, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.15 to \$2.20 base per 100 lb in lots of 200 kegs of 200 lb each or more, spikes, 1/2 in., 3/4-in. and 7/16-in., \$2.25 to \$2.30 base; 5/16-in., \$2.25 to \$2.30 base. Boat and barge spikes, \$2.25 to \$2.30 base per 100 lb in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c to 3 25c base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 300 lb., \$9.30 per package; 8 lb coating, 1 C, \$9.80; 16-lb. coating, 1 C, \$11.80; 20-lb coating, 1 C, \$13; 25-lb. coating, 1 C, \$14.25; 30-lb coating 1 C, \$15.25; 35-lb. coating, 1 C, \$16.25; 40 lb. coating, 1 C, \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1 in. from mill. Rolled bar iron 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card

Steel				Butt Weld			
Inches	Black	Galv.		Inches	Black	Galv.	
1/4	54 1/2	28		1/4 to 3/8	36 1/2	18 1/2	
1/2 to 3/4	60	33 1/2		3/8	36 1/2	27 1/2	
1/2	65	50 1/2		1 to 1 1/2	44 1/2	29 1/2	
3/4	69	56 1/2					
1 to 3	71	58 1/2					
				Lap Weld			
2	64	51 1/2		2	39 1/2	25 1/2	
2 1/2 to 6	68	55 1/2		2 1/2 to 6	42 1/2	29 1/2	
7 to 8	65	51 1/2		7 to 12	40 1/2	27 1/2	
9 to 12	64	50 1/2					
				Butt Weld, extra strong, plain ends			
1/4	60 1/2	33		1/4 to 3/8	36 1/2	23 1/2	
1/4 to 3/8	56	33 1/2		3/8	42 1/2	28 1/2	
1/2	62	50 1/2		1 to 1 1/2	44 1/2	30 1/2	
3/4	67	55 1/2					
1 to 1 1/2	69	57 1/2					
2 to 3	70	58 1/2					
				Lap Weld, extra strong, plain ends			
2	62	50 1/2		2	40 1/2	27 1/2	
2 1/2 to 4	66	54 1/2		2 1/2 to 4	43 1/2	31 1/2	
4 1/2 to 6	65	53 1/2		4 1/2 to 6	42 1/2	30 1/2	
7 to 8	61	47 1/2		7 to 8	35 1/2	23 1/2	
9 to 12	55	41 1/2		9 to 12	30 1/2	18 1/2	

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh.

Lap Welded Steel		Charcoal Iron	
1 1/2 in.	26 1/2	1 1/2 in.	5
2 to 2 1/2 in.	41	2 to 2 1/2 in.	15
2 1/2 to 3 in.	52	2 1/2 to 3 in.	25
3 1/2 to 13 in.	57	3 1/2 to 4 1/2 in.	32

Standard Commercial Seamless Roller Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow.

Blue Annealed		Cents per Lb.	
No. 8 and heavier	2.20	No. 11 and 12	2.30
No. 9 and 10 (base)	2.25	No. 13 and 14	2.35
		No. 15 and 16	2.45
Box Annealed, One Pass Cold Rolled		Cents per Lb.	
No. 17 to 21	2.80	No. 28 (base)	3.00
No. 22 to 24	2.85	No. 29	3.10
No. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		
Galvanized		Cents per Lb.	
No. 10 and 11	3.00	No. 25 and 26	3.70
No. 12 to 14	3.10	No. 27	3.85
No. 15 and 16	3.25	No. 28 (base)	4.00
No. 17 to 21	3.40	No. 29	4.25
No. 22 to 24	3.55	No. 30	4.50
Tin-Mill Black Plate		Cents per Lb.	
No. 15 and 16	2.80	No. 28 (base)	3.00
No. 17 to 21	2.85	No. 29	3.05
No. 22 to 24	2.90	No. 30	3.08
No. 25 to 27	2.95	No. 30 1/2 and 31	3.15

PERSONAL

At a recent meeting of the Cleveland Worm & Gear Co., Cleveland, J. W. Hertzler, who has been vice-president, secretary and general manager of that company, was made president, succeeding F. M. Gregg in that capacity. Mr. Hertzler continues as general manager. Arthur H. Clark, who has been treasurer, was given the additional duties of the secretaryship. A. V. Cannon was elected vice-president.

Samuel Mather, of Pickands, Mather & Co., Cleveland has made a gift of approximately \$2,500,000 to the Western Reserve University, Cleveland, having offered to bear the entire cost of erecting the new Medical School buildings for the university. This gift makes a total of more than \$4,000,000 given by Mr. Mather to this Cleveland institution.

Frank G. Payson of the Frank G. Payson Co., 9 South Clinton Street, Chicago, general sales agent for the Logan air-operated chucks and labor-saving devices, has been appointed manager of sales for the Logansport Machine Co., at Logansport, Ind., effective Feb. 1. The Frank G. Payson Co. will discontinue business and the corporation has been dissolved.

M. B. Hoagland, formerly of the United States Steel Corporation, has been elected president and general manager of the Signal Motor Truck Co., Detroit.

F. J. Griffiths, who recently announced his resignation as vice president and general manager of the Central Steel Co., Massillon, Ohio, will remain with the company in his former capacity, having been re-elected at a recent meeting, when the reorganization of the company was completed. The reorganized company, with the consolidation of formerly affiliated units, has practically the same organization as before. R. E. Bobb is chairman and president, C. E. Stuart, secretary and treasurer; C. C. Chase, vice president, and in charge of the sheet division; H. M. Naugle, vice president and in charge of the metal lumber division; J. M. Schlendorf, manager of sales; R. F. Fairless, superintendent and manager of operations; Myron Phillips, manager of production; E. C. Smith, chief metallurgist, and George D. Evans, purchasing agent.

Charles A. Irwin, until recently vice-president and general manager of the Canton Sheet Steel Co., Canton, Ohio, has become president and treasurer of the Milwaukee Rolling Mill Co., Milwaukee, Wis., which completed a sheet mill plant last year. He left for Milwaukee this week to assume his new duties. Mr. Irwin was president of the Canton company from the time its plant was built in 1909 until it was taken over a few years ago by the Hydraulic Steel Co. of Cleveland. His son, Jay Irwin, who has been assistant auditor of the Canton company, has resigned and will be associated with his father at the Milwaukee plant.

Ambrose Swasey, Warner & Swasey Co., Cleveland, has been appointed for the third term to serve on the National assay committee, this appointment being made by President Warren G. Harding. Mr. Swasey was first appointed on this committee in 1909 by President Theodore Roosevelt and was reappointed in 1913 by President William H. Taft. The assay committee tests the quality and weight of samples of coins made in the Government mints each year.

Charles M. Foote, for 24 years with the American Tube & Stamping Co., Bridgeport, Conn., latterly as sales manager, has resigned that position to become sales manager of the Columbia Steel Co., Elyria, Ohio,

manufacturer of cold-rolled strip steel. Mr. Foote will make his headquarters at the New York offices of the company at 258 Broadway.

At the annual meeting of the Duquesne Steel Foundry Co., Pittsburgh, D. C. Bakewell was elected president; W. E. Hohltzelle, first vice-president; L. A. Way, second vice-president; B. P. Bakewell, secretary, and E. S. Eggers, treasurer.

Lew L. Harr, vice-president and director, Graton & Knight Mfg. Co., Worcester, Mass., belting, has resigned, effective April 1, for the purpose of devoting his entire time to various interests in China.

The following officers of the Alan Wood Iron & Steel Co. were elected at the annual meeting held on Jan. 25: President, Richard G. Wood; vice-president, Jonathan R. Jones; vice-president, Ledyard Heckscher; vice-president and treasurer, Howard Wood, Jr.; vice-president and assistant treasurer, Alan D. Wood; secretary, John W. Logan; assistant treasurer and assistant secretary, A. Markley Harry; assistant secretary, J. H. Woodhead. On the same day Howard Wood, Jr., was elected president of Upper Merion and Plymouth Railroad Co.

George B. Mitchell has resigned, effective Feb. 1, as assistant sales manager, cold-rolled department, Jones & Laughlin Steel Co., Pittsburgh, to become special sales representative, Wyckoff Drawn Steel Co., Pittsburgh. Mr. Mitchell was associated with the Jones & Laughlin Steel Co. for more than 20 years, rising through various grades in the sales department to the position he has just relinquished. He takes with him to his new affiliation a wide experience in the sale of cold-finished steel products and has an extensive acquaintance in the trade. He is a member of the Duquesne, Union, Pittsburgh Field Club, Pittsburgh Athletic Association, Pittsburgh, and Society of Automotive Engineers of New York.

Frank S. Slocum, special representative, Jones & Laughlin Steel Co., Pittsburgh, has gone on a brief vacation in Bermuda.

John Stambaugh, director of the Brier Hill Steel Co., Youngstown, Ohio, leaves this week for a tour of Europe, accompanied by his wife.

M. J. Ward, for the past seven years superintendent of the sheet galvanizing department of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has resigned to accept a position with the Empire Rolling Mill Co., Cleveland. He will install a galvanizing department at the Empire company's plant and take charge following its completion. Mr. Ward was formerly in charge of the galvanizing department of the American Sheet & Tin Plate Co.'s sheet mill plant at Gary, Ind., prior to becoming identified with the Sheet & Tube company.

Howard E. Handy has severed his connection with the Washington Steel & Ordnance Co. as assistant metallurgical superintendent. His temporary address is 773 Elmwood Avenue, Providence, R. I.

Carl F. Deitz, president Bridgeport Brass Co., Bridgeport, Conn., announces a reorganization of the personnel to meet the requirements of a new cost-accounting system. Walter R. Clark has been made general works manager; Arthur Brewer, manager mill costs department; E. R. Feicht is in charge of the engineering and maintenance department; G. E. Oakley, manager fabricating department, and Warren D. Blatz is general sales manager. Mr. Deitz formerly was prominently identified with the Norton Co., Worcester, Mass., abrasives and grinding machinery.



J. W. HERTZLER



GEORGE B. MITCHELL

Ralph Leavenworth has returned to the Standard Parts Co., Cleveland, as advertising manager, which position he relinquished some months ago to take up another line of work.

Robert Steinemann has been elected vice-president and general manager of the Tide-Water Corporation, 8 West Fortieth Street, New York, pulverizer of iron. Mr. Steinemann resigns from the National Aniline & Chemical Co., Inc., to take up his new duties. Since Feb. 1 the officers of the company have been as follows: Martyn H. Newman, president; Robert Steinemann, vice-president and general manager; John Hall Jones, secretary and treasurer.

G. M. Ruhf, president and factory manager Exeter Machine Works, Inc., West Pittston, Pa., has resigned.

H. G. Schaeffer, formerly assistant district manager of the Continental Iron & Steel Co., at Chicago has joined the Reliable Iron & Metal Co., dealer in iron, steel and metals, Peoria, Ill. He assumes charge of a new department handling steel on a general brokerage basis.

Rumsey W. Scott, an engineer, has been elected a vice-president of the Chemical National Bank of New York, which in October, 1920, created an industrial department for the purpose of giving technical assistance to credit officers of the bank. Mr. Scott, then Vice-President of the Technical Advisory Corporation, consulting industrial engineers, was appointed manager of the department.

The Ajax Metal Co., Philadelphia, has appointed H. L. Carpenter Jr., formerly in charge of their Pittsburgh Office and later connected with its main office in Philadelphia, traveling representative in western Pennsylvania.

William J. Cleary has been appointed assistant general sales manager of the Sharon Pressed Steel Co., Sharon, Pa., headquarters at 1214 Dime Bank Building, Detroit. He was identified for 14 years with the automotive industry, most of the time with the Studebaker Corporation as assistant general purchasing agent and for two years as general purchasing agent of the Willys Corporation, with headquarters at Elizabeth, N. J.

W. W. Scott, Jr., formerly manager of sales in St. Louis for Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron and Railroad Co. has become general manager of sales of the Lackde Steel Co. St. Louis.

T. H. Hays has been appointed manager of the Indianapolis office of the Westinghouse Electric & Mfg. Co. A. E. Hitchner, assistant to the manager, industrial department, in general charge of the mining and electro-chemical industries, until further notice will have general charge of the sections formerly handled by W. H. Patterson, who recently resigned to accept the position of vice-president of the Kuestner & Hecht Co. Chicago, elevator manufacturer.

Charles M. Sullivan has resigned as sales engineer in the Pittsburgh office of Manning, Maxwell & Moore Inc., to become Cleveland district sales representative for Kaestner & Hecht Co., Chicago, elevator manufacturer, effective Feb. 1. Mr. Sullivan prior to becoming affiliated with Manning, Maxwell & Moore Inc., was Pittsburgh district sales manager, Milwaukee Electric Crane & Mfg. Co., Milwaukee. He was graduated from the University of Illinois, with the degree bachelor of science in electrical engineering.

Robert W. Wolcott has been made manager of the New Orleans branch of the Lukens Steel Co., Coatesville, Pa., succeeding the late James W. Porch. Mr. Porch died in July, 1921, after 23 years' service at New Orleans. Mr. Wolcott has been connected with the sales department of Bethlehem Fabricators, Inc., Bethlehem, Pa.

OBITUARY

Henry A. Carpenter

HENRY ALDEN CARPENTER, aged 55, of the General Fire Extinguisher Co., Providence, R. I., died at his home Jan. 27. He was born in Providence, July 7,



HENRY A. CARPENTER

1867. In 1889, together with his father and brother, he established the Alva Carpenter & Sons Foundry Co., becoming vice-president and treasurer. The Carpenter company was merged with the General Fire Extinguisher Co. in 1911 and Mr. Carpenter joined the new organization, becoming by successive steps manager of the five foundries of the company, plant manager of the Auburn establishment, member of the executive board, publicity and promotion manager, and a director. He held the office at the time of his death.

Mr. Carpenter was president of the New England Foundrymen's Association for a number of years. Joining the American Foundrymen's Association in 1896, he was vice-president in 1905 and 1913 to 1916, and was one of the incorporators when the association was incorporated July 3, 1916. Mr. Carpenter was also a member of the National Foundrymen's Association, holding office as vice-president for three years prior to November, 1908, when he became president, succeeding O. P. Briggs. He served as president during 1908-1909.

Always active in city affairs in Providence, he was a member of the city council from 1905 to 1907 and one of the leaders in the Providence Chamber of Commerce, over which he presided in 1917. He was also a director of the Union Trust Co., the Rhode Island Insurance Co. and the Homeopathic Hospital. Mr. Carpenter was prominent in Masonic circles and had held some of the highest offices in the order. He was also a member of the Benevolent and Protective Order of Elks, and among the many clubs, was a member of the Engineers' Club of New York. He was credited with great service in the prevention of fires.

MRS. ELIZABETH COCHRAN SEAMAN, who was president of the Ronclad Mfg. Co. and American Steel Braid Co., Brooklyn, for a number of years, died Jan. 27. She was born in 1867 and in 1897 married Robert L. Seaman, an aged and wealthy Brooklyn manufacturer, who died in 1901, leaving his entire property, including the two companies, to her. She assumed management of the properties and encountered many difficulties, including much litigation in which she was finally successful. Many years before her marriage, Mr. Seaman, under the pen name of Nellie Bly, was engaged in newspaper work and became well known on account of a trip around the world which she made in 1889-1890 in 72 days, 6 hours and 11 minutes, to show that Jules Verne's imaginative romance "Around the World in Eighty Days" was not an exaggeration. A few years ago she returned to newspaper work.

HOWARD V. LEWIS, Fitchburg Machine Works, Fitchburg, Mass., died Jan. 26, aged 13. Mr. Lewis was educated at Harvard University, and after leaving college was employed for a number of years by the American Tool Works, Cincinnati. He then became a manufacturer's representative in New York and later, for about a year, was with the Allied Machinery Co., making a trip to Europe. Since November, 1915, he had been with the Fitchburg Machine Works.

WALTER A. COOK, president of the Acme Road Machinery Co., Frankfort, N. Y., died, Jan. 23, age 80 years.

British Iron and Steel Market

General Softening Tendency to Prices—Tin Plate Demand Falling Off—Continental Competition Not Entirely Distanced

(By Cable)

LONDON, ENGLAND, Jan. 31.

There is further improved demand for pig iron, but the business placed is still unimportant. Buyers are disinclined to commit themselves for forward business. The demand for hematite is expanding, but it is still insufficient to absorb the total output, and makers are granting small concessions.

Foreign-ore consumers are showing more interest. Best Bilbao Rubio is being sold at 26s. (\$5.54) ex-ship Tees.

Cammell, Laird & Co., Ltd., and United Steel Companies, Ltd., have secured home rail orders to the amount of 15,000 tons. Vickers, Ltd., has been awarded the contract for electrification of the South African railroads. There is an unconfirmed report to the effect that the international steel rail pool is to be revived.

Scotland is quoting ship plates at £9 (1.71c. per lb.) delivered. Export business generally is quiet.

German merchant bars are being sold at £7 15s. to £8 (1.47 to 1.52c. per lb.) f.o.b., for April and May shipment. Belgian and French merchant bars are held at £8 to £8 5s. (1.52 to 1.545c. per lb.) f.o.b., for April and May delivery. Luxemburg merchant bars are quoted at £7 15s. (1.47c. per lb.) f.o.b., for March and April shipment.

German plates are held at £8 10s. (1.62c. per lb.) f.o.b., for April and May shipment. French plates are being sold at £9 (1.71c. per lb.) f.o.b., for April and May delivery. German structural steel is quoted at

£7 10s. to £7 15s. (1.43 to 1.47c. per lb.) f.o.b., for April and May shipments.

Continental pig iron prices are practically nominal, owing to scarcity of supplies being offered.

American soft wire rods are offered here at \$11 12½s. (\$49.02) c.i.f. United Kingdom.

Tin plate demand is slow, and there are further mill stoppages. Some trades are hoping that the makers may agree to a definite restriction of output. It is anticipated that Australian demand will shortly revive.

Galvanized sheets are being sold at £15 15s. (3c. per lb.) f.o.b. Some makers are quoting £15 12½s. (2.97c. per lb.). Rangoon specifications are quoted at £23 10s. (4.47c. per lb.) f.o.b.

Far Eastern specifications for black sheets are being filled at £16 5s. (3.09c. per lb.) f.o.b. Some 24-gage has been sold at £12 15s. (2.42c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.26 per £1 as follows:

Durham coke, delivered..	£1 5s.	to £1 7s.	\$5.33 to \$5.75
Cleveland No. 1 foundry..	4 15		20.24
Cleveland No. 3 foundry..	4 10		19.17
Cleveland No. 4 foundry..	4 7½		18.64
Cleveland No. 4 forge....	4 10		19.17
Hematite	7 0*		29.82*
East Coast mixed	4 14	to 4 15	20.03 to 20.24
Perronmanganeese	15 0	& 14 10*	63.90 & 61.77*
Rails, 60 lb. and up.....	8 0	to 9 10	34.08 to 40.47
Billets	7 0	to 7 10	29.82 to 31.95
Sheet and tin plate bars,			
Welsh	7 5	to 7 7½	30.89 to 31.42
Tin plate, base box.....	0 19	to 0 19½	4.05 to 4.16
			C. per lb.
Ship plates	9 0	to 10 10	1.71 to 2.00
Boiler plates	12 10	to 14 0	2.38 to 2.68
Tees	9 10	to 11 0	1.81 to 2.09
Channels	8 15	to 10 5	1.66 to 1.95
Beams	8 5	to 10 0	1.57 to 1.90
Round bars, ¾ to 3 in....	10 10		2.00
Galvanized sheets, 24 g..	15 12½	to 16 0	2.97 to 3.04
Black sheets	12 15	to 13 0	2.43 to 2.47
Steel hoops	12 0	& 12 5*	2.25 & 2.33*
Cold rolled steel strip, 20 g.	24 5		4.61

*Export price.

Further Reductions in Pig Iron and Steel— Shipbuilding Outlook Now Promising — Labor Less Exacting

LONDON, ENGLAND, Jan. 11.—General conditions are not bright although the business community has got into a way of telling one another that things are better. In some respects they are, in that iron and steel prices, which have lagged behind the others in the decline, are now gradually coming down to a more economic level. Wage reductions are accepted, if not without demur at least without strikes, and there is a general disposition to help the reconstruction of business in every way practicable.

It is stated that, while there is nothing much to boast about, yet in the shipping position, the outlook is considered to be more promising and the return of optimism seems to be permanent. A good sign is the steady demand for second-hand tonnage. Of course it is realized that during the next year or two British ship owners will have to face severe competition from foreign lines and will be called on to do so at a time when their resources are weakened by war taxation. The merchant tonnage under construction in the United Kingdom at the end of December was 2,640,319 tons or a reduction of 643,000 tons compared with the total at the end of the previous quarter. Of course in order to make a correct comparison with normal times two factors must be remembered, namely, that over 720,000 tons included in the present total, represent ships under construction, though work on them has been suspended; also a number of vessels, the completion of which has been postponed.

Until the last few days business in the Cleveland iron market was more or less under the influence of the holidays, but Cleveland No. 1 and No. 3 foundry irons have been reduced 10s. to £4 15s. and £4 10s. per ton respectively. Meantime No. 4 foundry and No. 4 forge

are down 7s. 6d. to £4 7s. 6d. and £4 2s. 6d. At these lower levels there are fairly strong hopes that more business will develop. In finished materials, steel prices are gradually coming down and getting nearer to the continental level, so that prospects of increased bookings by British works are undoubtedly broadening, largely owing to the fact that they have the advantage of being able to give quick delivery.

Some little time ago it was reported that a large quantity of scrap steel had been sold by this country to Germany. This, however, seems to have been hardly accurate, as in actual fact what was sold to Germany was several warships for breaking up purposes.

It is reported that a new Sheffield company called Industrial Steels, Ltd., has been formed with a capital of £700,000 for the purpose of acquiring from Messrs. Jonas & Colver the Novo works.

Edgar T. Ward's Sons Co., iron and steel merchant, has removed its New York office to its Waverly warehouse, 394 Frelinghuysen Avenue, Newark, N. J. The stock formerly carried in the New York warehouse at 260 West Street is being divided between the Brooklyn warehouse at the foot of Forty-ninth Street, Brooklyn, and the New Jersey establishment. The warehouse at 260 West Street will be closed. To avoid confusion in telephoning, the number Cortlandt 2066 will be connected with the Newark office as well as the former Newark number of Waverly 8700. The Brooklyn warehouse number continues to be Sunset 7520.

In the study of the reduction of iron oxides by methane, being made at the Pacific Station of the U. S. Bureau of Mines, it has been established that, at temperatures up to at least 800 deg. C., methane is a very slow reacting reducing agent as compared with hydrogen or carbon monoxide.

BOOK REVIEWS

Fraser's Metal Products Directory.—Fourth Annual Edition. Pages 312, 6½ by 9 in. Published by the Fraser Publishing Co., Montreal, Canada. Price \$3.

A registry of Canadian manufacturers, wholesale dealers and agents connected with the hardware, metal, foundry, engineering, electrical and machinery industries. Wholesale dealers, merchants and others listed who do not manufacture are indicated by an asterisk before the name. The index is classified alphabetically by the product, and numbered consecutively for greater convenience. The number of the page is shown on the right of the index classifications, which aids materially in locating the list desired.

Outspinning the Spider, A Story of Wire and Wire Rope. By John Kimberly Mumford. Pages 137, 6 x 8½, illustrated. New York: Robert L. Stillson Co.

This is the story of the Roeblings. It visualizes the developments which made possible the Brooklyn Bridge, and all of the myriad activities which present day industrialism has called for from the maker of wire and wire rope. Written in an interesting manner, yet giving facts of manufacture and use in an authoritative way, the work carries the reader through the history of development from the earliest phases to the present. It relates in a vivid way the various processes used, the exacting care necessary in the manufacture of wire rope, and some of the multitudinous uses to which the rope is put. One of the most recent was the wire rope barrage laid down in the English Channel during the World War.

NEW TRADE PUBLICATIONS

Electric Motor.—Wagner Electric Mfg. Co., St. Louis. Bulletin No. 129. Contains a description of the Wagner "Pow-R-Tuff" polyphase motor and numerous illustrations. The bulletin describes how a motor was produced to be cool running, having better bearings; heavier shaft; protected conduit connections, easy to connect and disconnect; silent operation; strength and quality.

Drop Forgings.—Union Switch & Signal Co., Swissvale, Pa. A catalog entitled "Forging Ahead." The equipment and capacity of the company is described and typical forgings produced by the Union Switch & Signal Co. are illustrated and sizes and weights given. The booklet is printed on good paper and the illustrations are particularly clear.

Small Tools.—Rockford Milling Machine Co., Rockford, Ill. A pamphlet describing the company's line of arbors, collets, cutters, spring chucks, etc. for use on Rockford milling machines. All sizes are given and there are numerous illustrations.

Electric Cranes.—Northern Engineering Works, Detroit. A 16-page booklet illustrating Northern cranes operating in power houses, locomotive shops, foundries, car shops, railroad yards and machine shops. There are also detail photographs of electric hoists and hand power cranes. The booklet is called "a pigeon-hole reminder."

Patching Boiler Settings.—Quigley Furnace Specialties Co., 26 Cortlandt Street, New York. Bulletin No. 61 describes and illustrates the method of applying successfully boiler setting patches where Hyltemite and Carbosand are used.

Recorders.—Bristol Co., Waterbury, Conn. Catalog No. 1501, superseding No. 1500 and made to the size standard for the Bristol company's binder. Illustrates and describes the line of recording voltmeters, ammeters and wattmeters made by the company and the various charts for these instruments are illustrated in colors.

Piston Rings.—Waterhouse Welding Co., 15 Latham Street, Boston. Catalog dated Jan. 1, 1922; it illustrates, describes with complete tables, showing the sizes and prices, pistons, rings and pins for various passenger automobiles, trucks, motorcycles and motors. The booklet, which is intended for use as a reference by the buyer, contains blank memoranda pages for notes.

Heavy Forging Chain.—American Forge & Machine

Co., Canton, Ohio. A small folder describing a chain for heavy forgings, with drop forged links of chrome vanadium steel, which was perfected by this company for its own use about ten years ago and later sold to forge shops. This is the first advertising of the chain that the manufacturer has attempted.

Pulverized Coal System.—Bonnot Co., Canton, Ohio, which mentions it is the exclusive licensee in the United States of the Holbeck system of firing annealing furnaces with pulverized coal. Bulletin 61, with illustrations of annealing ovens equipped with the Holbeck system, covers costs, time saving, elimination of smoke, labor saving, temperature control, elimination of coal storage and simple construction as factors in the system.

Waste in Power Plant Chimneys.—Uehling Instrument Co., 71 Broadway, New York. Two bulletins, No. 220, "Magnitude of the Power Plant's Chimney Loss," and No. 221, "Relation Between CO₂ and Money Wasted Up the Chimney," contains a graphic presentation of these problems. Both bulletins are replete with tables, formulas and diagrams.

Calendar.—Youngstown Sheet & Tube Co., Youngstown. About 17½-in. by 26-in., printed in colors. On the January sheet is a reproduction of a photograph of Bessemer converters in operation and a table of products and annual capacity of the company. The succeeding sheets are headed with photographs of the ore handling docks at Lake Superior, blast furnace, open hearth furnace, blooming mill, tube mills, a sheet mill, wire mill and the manufacture of forged couplings.

Calendar.—Park & Williams, Philadelphia. Carries a photograph of the Swede furnaces, which this company represents. Three months are shown at a time, the current month, the previous and the coming month.

Cinder Cars.—Weimer Machine Works Co., Lebanon, Pa. Two folders of six pages each illustrate in full page photographs Edgar A. Weimer's patent cinder cars, styles J and K respectively. Each style is shown tilted in various directions and there is brief description accompanying the illustrations.

Babbitt Motor Bearings.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Circular reprint No. 104. The publication is a discussion of the production of babbitt metal by J. S. Dean, railway motor engineering department, Westinghouse company, and contains a number of photographs of equipments used in the manufacture of babbitt metals as well as the results of various tests of samples of alloys.

New Books Received

Essentials of Industrial Costing. By George S. Armstrong. Pages 297, 5½ x 8¾ in.; illustrations 80. Published by D. Appleton & Co., 35 West Thirty-second Street, New York.

A Life of George Westinghouse. By Henry G. Prout. Pages xii + 375, 6 x 9 in. Published by Charles Scribner's Sons, 597 Fifth Avenue, New York. Price \$22.50.

Fraser's Metal Products Directory, covering all Canada. Fourth Edition. Pages 312, 6 x 9 in. Published by the Fraser Publishing Co., 128 Bleury Street, Montreal, Canada. Price \$3.

Proceedings of the American Society for Testing Materials. Vol. 21, 1921. Pages 1197, 6 x 9 in.; 31 committee reports, 24 technical papers, 93 tentative standards. Published by the Society, 1315 Spruce Street, Philadelphia. Price \$10 in paper binding.

The Modern Gas Tractor. By Victor W. Page. Pages 574, 4¾ x 7¼ in. illustrations 265. Published by the Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price \$3.00.

The Blacksmith's Pocket Book. By Tom Wormald. Pages 84, 4¾ x 7¼ in. Published by Scott, Greenwood & Son, 8 Broadway, Ludgate, London, E. C. 4, England. For sale by D. Van Nostrand Co., 8 Warren Street, New York.

The Ship Compendium and Year Book 1922. Pages 1008, 8½ x 11 in. 8 maps and 800 sections containing names and addresses of 30,000 firms interested in ship and shipping. Published by Compendium, Ltd., 18 Old Compton Street, London, W. 1, England.

Le Sciage des Metaux. By C. Codron. Pages 468, 9 x 11 in. illustrations 536. Published by Dunod, 47 Quai des Grands-Augustins, Paris (VI), France.

IRON AND INDUSTRIAL STOCKS

Selling of Steel Shares on Merger Talk Noted the Past Week

Indications the past week were that at least some people, who previously bought shares of those steel properties concerned in proposed mergers, sold their holdings because it was talked about the financial districts that these mergers would not materialize, the parties interested not being able to agree on various details. Such selling, coupled with earnings reports by the larger steel companies showing deficits, has resulted in a lower range of prices. All things considered, however, values of iron and steel shares hold up remarkably well, which bespeaks confidence in the future rather than conditions which have passed.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allegheny com. 41 - 44 1/2	Midvale Steel .. 29 1/2 - 32
Allegheny pf. 90 - 91 1/2	Nat. Acme .. 12 1/2
Am. Can. com. 33 1/2 - 38	Nat. E. & S. com. 35 1/2 - 36 1/2
Am. Can. pf. 95 1/2 - 96 1/2	Nat. E. & S. pf. 85 - 88 1/2
Am. C. & F. com. 145 - 147	N. Y. Air Brake .. 58 1/2
Am. C. & F. pf. 117 1/2 - 118 1/2	Nova Scotia Steel 25 - 27
Am. Loco. com. 104 1/2 - 108 1/2	Press. Steel com. 63 1/2 - 65
Am. Loco. pf. 114 - 114 1/2	Ry. S. Sdg. com. 95 1/2 - 98
Am. Rad. com. 83	Ry. S. Sdg. pf. 108 1/2 - 110 1/2
Am. Stl. F. com. 30 1/2 - 33 1/2	Repl. Steel .. 30 - 33 1/2
Am. Stl. F. pf. 94 - 94 1/2	Republic com. 49 1/2 - 51 1/2
Bald. Loco. com. 94 1/2 - 97 1/2	Republic pf. 84 1/2 - 87 1/2
Bald. Loco. pf. 106 - 106 1/2	Sloss com. 40 - 42
Beth. Steel com. 55 - 57	Sloss pf. 77
Beth. Stl. Cl. U. 59 - 61 1/2	Superior Steel .. 30
Beth. Stl. 8 1/2 pf. 107 1/2 - 108	Trans-Williams .. 33
Colorado Fuel .. 26 - 27 1/2	Un. Alloy Steel .. 26 1/2 - 27 1/2
Cruc. Steel com. 59 1/2 - 64	U. S. Pipe com. 18 1/2 - 21
Cruc. Steel pf. 81 - 82	U. S. Pipe pf. 57 - 60 1/2
General Elec. 141 - 144 1/2	U. S. Steel com. 85 1/2 - 86 1/2
Gr. No. Ore Cert. 31 1/2 - 32	U. S. Steel pf. 116 1/2 - 117
Gulf States Steel 64 - 78 1/2	Vannadium Steel .. 33 - 35 1/2
Int. Har. com. 81 1/2 - 83 1/2	Va. I. C. & C. 78 - 87 1/2
Int. Har. pf. 106 - 106 1/2	Westhouse Elec. 50 1/2 - 51 1/2
Lack. Steel .. 45 1/2 - 48 1/2	

Industrial Finances

The preliminary statement of Virginia Iron, Coal & Coke Co. for year ended Dec. 31, 1921, shows net earnings after interest and taxes of \$423,889. Inventory adjustments for the year have yet to be made, and estimates of their effect on earnings are not yet available.

At the directors' meeting it was decided to omit the dividend of 1 1/2 per cent on the cumulative preferred stock of the Taylor-Wharton Iron & Steel Co.

The annual report of W. A. Layman, President Wagner Electric Mfg. Co., St. Louis, shows that the bank and broker obligations reached their maximum on Jan. 15, 1921, at \$1,050,000 and were reduced approximately \$2,000,000 or 20 per cent, to \$4,027,950 on Nov. 15 last. The total obligations on January 1, 1921, were \$7,139,283, which was reduced to \$4,277,950 on Nov. 15. Mr. Layman was re-elected president, and Paul Brown, a director, was elected first vice-president to succeed Walter Robbins, who resigned last July.

The receivership of the Fulton Motors Corporation, 34 Pine Street, New York, operative since 1919, has been terminated, and the property returned to the company. All obligations have been paid.

Attorneys for stockholders of Pusey & Jones, Wilmington, Del., with shipbuilding plants at Wilmington and Gloucester City, N. J., have filed a petition in the United States District Court at Wilmington asking that the bankruptcy proceedings against the company be dismissed.

A petition in bankruptcy has been filed against the Brooklyn Alloys Co., 15 Fulton Street, Brooklyn, by a number of creditors. Louis J. Castellano has been appointed receiver.

The Large-Baker Corporation, Phoenix, N. Y., manufacturers of couplings, etc., has filed an involuntary petition in bankruptcy.

The Collins Co., Collinsville, Conn., edge tools, recently declared a quarterly dividend of 2 per cent. The company heretofore paid at the rate of 16 per cent on its stock. Sales are about one-third the company's capacity.

During the three months ending Dec. 31 the Virginia Iron, Coal & Coke Co., after interest and taxes, but before inventory adjustments, operated at a net loss of \$71,698, contrasted with a profit of \$334,108 in the last three months of 1920. Net earnings for 1921 were \$423,889 after taxes and interest, whereas in 1920 they were \$3,263,026. The directors have declared a stock dividend of 50 per cent, payable in 5 per cent cumulative preferred stock on Feb. 15 to common shareholders of record Feb. 1.

Sidney E. Phillips, Spencer Turbine Co., Hartford, Conn., has been made receiver for the Connecticut Blower Co., Inc., that city, to succeed William A. Foley, temporary receiver. The plant, which was closed, is to resume operations.

Net sales of the J. I. Case Plow Works Co. for the 15 months ending Sept. 30 last were \$4,728,557; operating expenses, inventory adjustment, etc., \$7,396,520; the operating loss, \$2,667,963, and the net loss for the period, \$2,985,794.

The Michigan Securities Commission has authorized the sale of \$791,000 of stock in the new Iron Mountain Mining & Furnace Co., which is to make charcoal iron at Iron Mountain, Mich. The project is backed by the Cleveland-Cliffs Iron Co.

The Michigan Securities Commission has authorized the sale of \$500,000 of stock in the Cyclone Motors Co., Benton Harbor, Mich. The company is headed by J. N. Eaton, formerly of the Lincoln Motors Co., Detroit. The proceeds of the stock sale are to be used in extending the operations of the company, which manufactures motorcycles.

Owing to the demand for foundry sand, the volume of business of the Portage Silica Co., Youngstown, Ohio, this month is double the rate of January, 1921. Last year business was at an average rate of 55 per cent of capacity, shareholders were informed at the annual meeting Jan. 24. Joseph G. Butler, Jr. was elected president and treasurer of the company; E. E. Klooz, first vice-president and general manager; J. B. Chambers, second vice-president and Lee R. Farrell, secretary and manager of sales.

Business of the Youngstown Foundry & Machine Co., Youngstown, Ohio, averaged 35 per cent of capacity in 1921, shareholders were told Jan. 24 at the yearly meeting. The company produces chilled, sand and semi-steel rolls, iron castings, rolling mill machinery, ingot cars, roll lathes, shears and the like. Directors were re-elected.

The Brler Hill Steel Co., Youngstown, Ohio has declared the regular quarterly preferred dividend of \$1.75 per share, payable April 1 to holders of record March 20.

The Otis Steel Co., Cleveland, reports for the first three quarters of 1921 a net loss of \$1,214,550 after charges but before depreciation. Its net operating loss was \$924,187, and other income \$68,983. The company's income charges amounted to \$297,464, and its subsidiary companies' losses to \$61,882. Preferred dividends of \$309,071 were declared by the company, making its final deficit for the year \$1,523,621.

Earnings of Bethlehem Steel Corporation

The Bethlehem Steel Corporation had gross sales and earnings of \$147,794,352 in 1921, as compared with \$274,431,236 for 1920. After deducting manufacturing cost and operating expenses there was a net manufacturing profit of \$21,850,533, as compared with \$34,962,371 in 1920.

Other income amounted to \$3,904,144, making total net earnings \$25,754,677. After deducting for interest, discount, depreciation and depletion and expense of bond and note issues applicable to subsequent years, there was left a balance of \$8,028,803.

President Grace said the net income of \$8,028,803 represented an earning of 7.6 per cent on the \$60,000,000 common stock, after payment of \$3,450,000 for preferred dividends. These earnings, he said, were largely from orders on the books at the beginning of the year, carried over from the war and the subsequent period of prosperity.

The year 1921, he said, was one of the worst ever experienced by the modern steel industry. On Dec. 31 last orders on hand amounted to only \$50,164,000, while at the end of 1920 booked orders were \$145,287,000. Business booked last year was \$52,672,000.

Mr. Grace said, however, that the corporation's current assets were \$89,636,875 more than current liabilities, whereas a year ago the excess had been \$77,474,000. Cash and liquid securities, largely United States Treasury obligations, amounted to \$54,881,227 on Dec. 31, 1921, compared with \$20,078,788 on the same date in 1920.

Value of all inventories at the end of the year was \$41,115,700, compared with \$73,208,678 at the close of 1920. Allowance for depreciation and depletion during the year was \$6,002,715. Total allowance for depreciation, depletion and amortization made out of earnings from 1916 to 1920, inclusive, was \$90,300,000 and adequately provided for the elimination from the corporation's plant values of its entire investment in ordnance plants made subsequent to 1914, as well as the excess cost of commercial plants constructed during the war period. Of a property account of \$335,000,000, less than \$8,000,000 is now represented by investment in ordnance works.

The directors declared the regular dividends on both classes of preferred stocks for the entire year 1921.

regular quarterly dividend of 1½ per cent was declared on common stock, payable April 1 to stock of record March 14.

Gulf States Deficit

Net operating income of Gulf States Steel Co. for quarter ended Dec. 31, 1921, was \$74,610, after deductions for taxes, depreciation and other charges, there was a deficit of \$11,937. After depreciation and taxes, and after marking down inventories as of Dec. 31, to the market, the deficit for the year 1921 was \$467,662.

Inland Makes Excellent Showing in 1921

Whereas most of the large independent steel manufacturers suffered heavy losses during the year 1921, the Inland Steel Co., Chicago, with plants at Indiana Harbor, Ind., and Chicago Heights, Ill., made net earnings after deducting charges for repairs and maintenance, inventory adjustment and reserve for taxes, of \$1,728,031. Allowance for depreciation of plants, provision for exhaustion of minerals, and deduction for bond interest, left net profits of \$510,728. This is regarded as a remarkable record in view of the long-continued depression in the steel industry which forced prices to a low level and permitted only partial operation of plant facilities. The company is prominently mentioned as a probable unit in the proposed merger of independent steel mills. The statement of earnings and condensed balance sheet follow:

Statement of earnings	
Year ending Dec. 31, 1921.	
Net earnings from operations.....	\$1,728,031.07
Less—	
Provision for depreciation of plants	\$377,059.00
Provision for exhaustion of minerals	34,934.29
Bond interest	305,310.00
Net profits for year.....	\$510,727.78
Add previous surplus	18,708,681.69
	\$19,219,409.47
Deduct—	
Dividends paid	1,013,964.00
Final surplus	\$18,205,445.47
Condensed balance sheet	
Dec. 31, 1921.	
<i>Assets</i>	
Capital assets—	
Land, plants and buildings.....	\$4,220,987.17
Current assets.....	15,009,797.75
Deferred charges—	
Advance royalty on ore, etc.....	318,642.85
	\$60,549,427.77
<i>Liabilities</i>	
Capital liabilities—	
Capital stock	\$29,331,475.00
Bonded debt	4,961,000.00
	30,292,475.00
Current liabilities—	
Accounts payable	709,496.06
Current payrolls	225,321.69
General taxes accrued.....	407,192.21
	1,342,009.96
Interest accrued on bonded debt.....	15,750.00
Reserves	10,693,747.34
Surplus	18,205,445.47
	\$60,549,427.77

The Lincoln Steel Co., 112-118 North May Street, Chicago, has been appointed by the Pittsburgh Cold Rolled Steel Co. Verona, Pa., to act as its agent in the Chicago district in the sale of cold rolled strip steel, flat wire, etc.

The Holden Co., of Toronto, Montreal, Winnipeg and Vancouver, announced that it has assumed control of the Canadian Brake Shoe Co., Sherbrooke, Que. All business pertaining to the latter company will be transacted at the head office of the Holden Company, 354 St. James Street, Montreal.

Trade Changes

The Doullut & Williams Co., Inc., engineer and general contractor, New Orleans, announces the reorganization consolidation and incorporation under the above title, with a capitalization of \$1,000,000, of the following companies and their various interests: Doullut & Williams, Inc., Southern Lighterage & Wrecking Co., Inc., Shell Beach Land & Improvement Co., Inc., with the increased capitalization and enlarged organization, the new company will continue to carry on the different operations previously handled by the above named companies. It will extend its operations to various kinds of construction.

The Alfred O. Blach Co., manufacturer of Blach modern carbonizers, announce removal from Chicago to its new plant at 545 Beaufait St., Detroit.

Mutually satisfactory arrangements have been made between the Combustion Engineering Corporation and the George J. Hagan Co., Pittsburgh, whereby the Hagan company discontinues representation of the Combustion Engineering Corporation. The Combustion Engineering Corporation has opened its own office in the First National Bank Building, Pittsburgh, and will soon open an office in Cleveland, both of which will be in charge of W. C. Stripe, former manager of the Philadelphia office. The George J. Hagan Company will retain the exclusive agency for the type "A" stoker formerly known as the American stoker, for use in Hagan industrial furnaces.

The Fisher Tool & Supply Co., Detroit, has removed from 151 East Jefferson Avenue to 45 East Baltimore Avenue.

The Pressed Steel Car Co. and Western Steel Car & Foundry Co. have discontinued their Washington office, effective Feb. 1. L. O. Cameron, who has been a representative of these companies in the Southern territory for many years, has severed his connections with the companies, but will continue his office in the Munsey Building to handle other accounts.

The Craty Machine Co., Benton Harbor, Mich., has changed its name to the Vico Machine Co.

The sales and engineering departments of the New England Structural Co., 11th floor, 110 State St., Boston, as of Feb. 1 will be consolidated with the general offices of the company at its Everett, Mass., plant. No departure from the established methods of operation are contemplated by the company.

The Skinner Engine Co., Erie, Pa., has placed its account for the Pittsburgh district in the hands of the Andrews-Bradshaw Co., 812 R. F. Jones Building, Pittsburgh.

The name of the Brown-McDonald Machinery Co., St. Louis, has been changed to Brown Machinery Co.

The Dominion Asbestos & Rubber Corporation, now located at 151 Nassau Street, New York, will move its executive offices to more commodious quarters at 1780-82 Broadway. It will retain its present store and shipping office at 47 Murray Street, for the convenience of its marine and industrial patrons, but will remove its stock of automotive equipment lines to its new address.

The Robert Gordon Co., Chicago, has moved from 624 Monroe Street to 1355 W. Washington Street.

The Dayton-Dowd Co., manufacturer of centrifugal pumps, Quincy, Ill., has opened a district office in Pittsburgh at 809 Keenan Building, covering the sale of centrifugal pumps and underwriters' fire pumps. The office will be in charge of T. J. Barry, who for the past several years has been with the home office on engineering and sales.

The Morley Machinery Corporation (successor to the W. A. Wilson Machine Co. and the Rochester Boiler Works), manufacturer of iron planers and special machinery, is now located in the plant formerly occupied by the Defiance Check Writer Corporation, 792-814 St. Paul Street, Rochester, N. Y. New equipment has been purchased. The new property has a railroad siding.

The Stow Flexible Shaft Co., manufacturer of portable drilling and grinding machines and flexible shafts, has moved to its new plant at 3452 Ludlow Street, Philadelphia.

Reports to the U. S. Geological Survey indicate a very large decrease in the output of chemical lime in 1921, due to the decline and depression in the metallurgical and chemical industries. The production of dead-burned dolomite, which has replaced calcined magnesite for use in patching and lining basic open-hearth furnaces, decreased from 316,000 tons in 1920 to 140,000 tons in 1921. Decreases of 25 to 65 per cent were reported for the plants that produce dead-burned dolomite. Decreases were also reported by plants that manufacture lime for use by paper mills, sugar factories, alkali works, carbide plants, and other chemical industries.

British coal competes with American in the West Indies and South and Central America, according to the Department of Commerce, because of a 46 per cent reduction in British miners' wages, while American miners still get war-time wages; a cut of 12½ per cent in coal rates on British railroads and a reduction of 25 per cent in British dock charges. In the three chief coal fields of Britain the average weekly wage of coal heavers is now reported at 57s. 4d. (\$12.04 at \$4.20 per £1). American coal has a great advantage in the use of machinery, 59 per cent of the 1919 product having been machine-mined, compared with 12.8 per cent of the British 1920 output.

Machinery Markets and News of the Works

MORE LARGE ORDERS

Automobile and Parts Manufacturers Are Buyers of Shop Equipment

Improvement in Machine-Tool Business Noted in Many of the Leading Centers

Though there are still many dull spots in the machine-tool trade, a trend toward improvement in business is noticeable. Orders recently placed by automobile manufacturers have created a much more hopeful feeling. A Cincinnati manufacturer received an order for 40 machines and an Eastern maker of grinding machines has booked an order for 25. A manufacturer of universal joints in Indiana has bought 20 small manufacturing lathes and three turret lathes.

In every market, with the possible exception of New York, there are some evidences of betterment. A Chicago dealer reports that if succeeding months of 1922 are as good as January, he will, at least, be able to conduct his business without loss. Cincinnati manufacturers of tools report an improvement over the pre-

vious week, though inquiries are mostly for single machines. New England business for January is reported to be well above that of December and fully 30 inquiries are pending, some for single tools, but a few running into larger quantities. A Westfield, Mass., manufacturer of heating equipment is in the market for about \$25,000 worth of tools for an experimental shop.

The Zigler Mfg. Co., Alexander, Ind., is inquiring for about a dozen tools. The Cleveland Board of Education is asking bids on six wood-working machines and two metal-working tools.

A new company in New England which contemplates entering into the manufacture of power plant equipment may close this week on a fairly large list of tools.

Railroad buying has dropped off, the theory being that the carriers are awaiting results of the freight rate hearings now being conducted by the Interstate Commerce Commission. The Maine Central is inquiring for a driving wheel lathe and two other tools.

About 115 used tools were sold last week by the Standard Parts Co., Cleveland. Most of the tools were sold to dealers, and the prices paid were very low.

New York

New York, Jan. 31

Judging by reports which machine-tool selling representatives in New York are receiving from their home offices there has been some improvement in machine-tool orders throughout the country, but apparently this improvement is more marked in other districts than the New York territory. Most of the large companies in the East which ordinarily are the most active buyers of machine tools are still pursuing a cautious policy. Such orders as are being received come more frequently from the smaller manufacturers. Demand for used tools is fairly active, and there is a slightly better demand for new machines, but inquiries are almost entirely for single tools.

Although sales of cranes are not numerous, a few good inquiries have appeared in the market the past week and there are prospects of greater activity next month. An old list, issued several months ago, by the American Brake Shoe & Foundry Co., New York, calling for 12 electric cranes ranging up to 7½-ton capacity, has appeared again for new prices. This company is submitting bids for the cast iron segments for the New York-New Jersey vehicular tunnel and the cranes will be purchased provided this contract is obtained. The Electric Bond & Share Co., 71 Broadway, New York, has inquired for a 40-ton, one motor, overhead traveling crane for a power house in Pennsylvania. A hand-power crane inquiry from the General Engineering & Management Association, 141 Broadway, New York, calls for bids on a 5-ton 31-ft. 6-in. crane, which will probably be shipped to a point in Texas. The Third Avenue Railway System, 2396 Third Avenue, New York, is receiving bids on a 2-ton, 42-ft. span, 3-motor, overhead traveling crane. The American Locomotive Co., 30 Church Street, New York, is in the market for a 3-ton electric hoist.

Among recent crane sales were: Chesapeake Iron Works, a 5-ton, 13-ft. span, single I-beam crane to the American Sugar Refining Co., for its Baltimore plant; Roeper Crane & Hoist Works, a 5-ton electric hoist to the Ransome Concrete Machinery Co., Dunellen, N. J.; Northern Engineering Works, a 25-ton, 36-ft. span, overhead traveling crane to the W. S. Burdett Co., 50 Pearl Street New York, for the Pennsylvania Edison Co., Reading, Pa.

The Cook Spring Co., which for a quarter of a century has been manufacturing springs for mechanical purposes in New York City, has completed a new and thoroughly equipped plant for the same purpose at Ann Arbor, Mich. During

recent years the center of the company's trade has moved steadily westward, and the Ann Arbor plant is nearer its trade center. The Eastern plant and office have been closed and dismantled.

The Superintendent of Lighthouses, Staten Island, N. Y., will take bids until Feb. 14 for two 30 hp., vertical double-cylinder air compressors, with twin air cylinders, oil engine driven.

The New York Edison Co., Irving Place and Fifteenth Street, New York, will soon take bids for the superstructure of its new one-story power house, 50 x 100 ft., at Park Avenue and 188th Street, estimated to cost about \$75,000. It has filed plans for a two-story power house, 25 x 103 ft., at 122 East Thirteenth Street, estimated to cost a like amount. William Whitehill, Forty-first Street and Sixth Avenue, is architect for both structures.

Fire, Jan. 26, destroyed a number of shops at the plant of the Morse Dry Dock & Repair Co., foot of Fifty-sixth Street, Brooklyn, including boiler shop, tool and pipe shop and company garage, with loss estimated at about \$200,000, including buildings and equipment. Edward P. Morse is president.

F. M. Schildwachter, 4130 Park Avenue, New York, is having plans completed for a four-story ice-manufacturing plant, 75 x 110 ft., on Webster Avenue, to cost about \$1,000,000 with machinery. William H. Meyer, 1861 Carter Avenue, is architect.

Gen. Franklin W. Ward, secretary to the State Board of Armory Commissioners, 158 State Street, Albany, N. Y., will take bids until Feb. 8 for a quantity of metal lockers.

The Acme Lighting Fixture Co., 132 West Fourteenth Street, New York, manufacturer of electric lighting and gas fixtures, has leased the entire six-story building, 40 x 100 ft., at 107-9 West Thirteenth Street for headquarters.

The Village Council, Rockville Center, L. I., is planning for extensions and improvements in the municipal electric light and power plant to cost about \$60,000.

The Janusch Mfg. Co., 282 East 135th Street, New York, manufacturer of brass goods, has inquiries out for a number of lathes and a screw press.

Fire, Jan. 23, destroyed the power house of the National Light & Power Co., Port Washington, L. I., with loss estimated at close to \$50,000. It will be rebuilt.

Albert Kellar, 1744 Garfield Street, New York, will take bids at once for a one-story cold storage plant at 489-15 East 108th Street, estimated to cost about \$35,000. A. Luprian, 705 Ninety-sixth Street, Woodhaven, L. I., is architect.

The William Bayley Co., 119 West Fortieth Street, New York, manufacturer of steel sash, etc., has purchased four city lots at Van Alst Avenue and Seventh Street, Long Island City, for new works. Plans will be drawn at an early date.

The Christian Feigenspan Co., 50 Freeman Street, Newark, N. J., will commence the immediate erection of a one-story ice-manufacturing plant at 71-85 Bishop Street, Jersey City, N. J., estimated to cost about \$50,000.

The Ingram Motor Co., 2 Rector Street, New York, Joseph Ingram, president, will build a one-story foundry in connection with its new automobile plant at Egg Harbor City, N. J. H. B. Perry is engineer.

A one-story power house will be erected by the Bogota Paper & Board Co., Bogota, N. J., in connection with a one-story addition, estimated to cost about \$40,000. The Austin Co., 217 Broadway, New York, is the contractor.

A vocational department will be installed in the new high school to be erected at Swedesboro, N. J., plans for which have been completed. Bids for construction are being taken until Feb. 6. Simon & Simon, 249 South Juniper Street, Philadelphia, are architects.

Motors, power and other mechanical equipment will be installed in the new plant to be erected by the Cumberland Glass Mfg. Co., Bridgeton, N. J., estimated to cost \$175,000. Keeley Brothers, Brighton, have the building contract.

John Keavey, 375 Palisade Avenue, West Hoboken, N. J., will take bids at once for a one-story automobile repair and service building, 75 x 100 ft., at Palisade Avenue and Maline Street, estimated to cost about \$50,000. McDerriott & Binda, 582 Bergouline Avenue, are architects.

The Fords Porcelain Works, Lehigh Avenue, Perth Amboy, N. J., has been incorporated as the Fords Porcelain Works Inc., with capital of \$1,000,000, to manufacture wash basins, sinks, lavatories, etc. It will operate two plants at Perth Amboy and one at Fords, near Perth Amboy. Abel Hansen is president.

Grinding mills, motors and other mechanical equipment will be installed in the new plant to be erected by the Orbis Products Trading Co., Wyckoff Avenue, Brooklyn, at Newark, N. J., occupying about 4 acres, recently purchased. It specializes in the production of essential oils. Plans will be completed at an early date.

The Department of Parks and Public Property, City Hall, Newark, N. J., is arranging for the erection of a new power plant to cost about \$150,000 in connection with the municipal market building, now in course of construction. Frank Grad, 245 Springfield Avenue, is architect.

A vocational department will be installed in the new two-story high school to be erected by the Board of Education Hightstown, N. J., estimated to cost \$150,000. Guilbert & Betelle, 516 Broad Street, Newark, architects, will prepare plans.

Philadelphia

PHILADELPHIA, JAN. 30

E. J. McAleer & Co., 1422 North Eighth Street, Philadelphia, manufacturers of tinware, metal products, etc., have awarded contract to the A. Raymond Raff Construction Co., 1635 Thompson Street, for an addition to cost about \$60,000.

The Moore & White Co., 2701-31 North Fifteenth Street, Philadelphia, manufacturer of friction clutches, machine products, etc., has awarded contract to Clarence W. MacDowell, 2118-20 Diamond Street, for a new foundry, estimated to cost \$33,000.

George W. Lindley, 5122 Wakefield Street, Philadelphia, operating a general machine works, has awarded contract to John F. Frith, 5817 Osceola Street, for a three-story addition, 32 x 102 ft., estimated to cost \$20,000.

The Philadelphia & West Chester Traction Co., Sixty-ninth Street Terminal, Philadelphia, will make extensions and improvements in its signal system and other mechanical departments to cost about \$75,000.

A one-story power house, 30 x 63 ft., will be constructed by the Ferris Shoe Co., Monmouth and Juniper streets, Philadelphia, in connection with its new five-story factory at Sixth and Duncannon streets. Plans are being prepared.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, is arranging for the sale of a bond issue for \$4,000,000, to be used in part for enlargements at its generating plant, including the installation of new equipment, and other extensions.

The S. V. Reeves Stove & Foundry Co., Twenty-second and Haydon streets, Camden, N. J., will soon break ground for a new two-story plant, 40 x 40 ft. S. V. Reeves is head.

The Norton Mfg. Co., Merchantville, N. J., manufacturer

of metal products, William Hinck, local representative, has awarded contract to M. T. James, Merchantville, for a new one-story factory, 60 x 175 ft.

The New Jersey State Highway Department, Trenton, N. J., has awarded contract to the Austin Co., Bulletin Building, Philadelphia, for its one-story automobile repair and service works at Fernwood, N. J., 106 x 400 ft., estimated to cost \$95,000. R. J. Wassier, Broad Street Bank Building, Trenton, is engineer.

George A. Swartz, York, Pa., and associates, have acquired the plant of the Pullman Automatic Ventilator Mfg. Co., York, and will use the structure for a similar line of production.

The Anthracite Brick & Tile Corporation, Wilkes-Barre, Pa., recently organized in Delaware with capital of \$255,000, has taken over the properties of the Keystone Clay Co., Wyoming, Pa., and plans for extensive operations for the manufacture of brick, tile, etc. It is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington, Del.

A vocational department will be installed in the new high school to be erected at Barnsboro, Pa., plans for which are being prepared by Hirsch & Sheller, Commerce Building, Altoona, Pa., architects. Bids will be asked in the spring.

The Lehigh Coal & Navigation Co., Lansford, Pa., has construction under way on a new coal breaker at Coaldate, estimated to cost close to \$1,000,000 with machinery.

The Du Roth Steel Truck & Car Wheel Co., Granite City, Pa., has commenced the erection of a new plant to manufacture car wheels and trucks under a new process. E. L. Du Roth heads the company.

A vocational department will be installed in the new high school to be erected at Easton, Pa. Bonds for \$1,000,000 were provided some time ago, but the project has been held in abeyance. Plans will be prepared in the near future.

The Royersford Needle Works, Royersford, Pa., will commence the immediate erection of a two-story addition, 50 x 150 ft., with extension, 25 x 32 ft., estimated to cost about \$25,000.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, etc., has completed foundations for a two-story addition, 32 x 120 ft., and will commence work on the superstructure at once. A. S. Kenner, 121 Hanover Street, Pottstown, Pa., is architect.

A vocational department will be installed in the new two-story and basement high school to be erected at Monaca, Pa., 135 x 200 ft., estimated to cost about \$300,000. F. M. Beall & Sons, Monaca, are architects.

Fire, Jan. 25, destroyed a portion of the smith shop at the plant of the American Car & Foundry Co., Berwick, Pa., with considerable loss. An estimate of the damage has not been announced.

A cold storage plant will be installed by the Franklin Brewing Co., Wilkes-Barre, Pa., in connection with its two-story addition, estimated to cost about \$25,000. Schmitt & Schroeder, Weitzenkern Building, are architects.

The Kolb Baking Co., Tenth and Reed streets, Philadelphia, has taken bids for the erection of a one-story automobile service and repair building, 125 x 250 ft., at Broad and Greene streets, to cost \$60,000. H. B. Weldon, 10 South Eighteenth Street, is architect.

Buffalo

BUFFALO, JAN. 30.

The Board of Education Buffalo, is having plans prepared for remodeling of a three-story building, 65 x 150 ft., at Georgia and Front streets, for a new vocational school, and will call for bids in February. H. L. Beck, Municipal Building, is architect.

The Artizan Factorie, Inc., North Tonawanda, N. Y., recently organized to manufacture metal products, with capital of \$100,000, has acquired about two acres of land near Division Street as a site for a new plant. Plans will be prepared at once.

Acer & Wheadon, Commercial Street, Medina, N. Y., manufacturer of sheet metal products, are arranging for the erection of a one-story addition, 85 x 100 ft., to double the present capacity.

A vocational school will be erected by the Board of Education, Rochester, N. Y., in connection with the new three-story high school, 345 x 450 ft., at Hudson Avenue and Norton Street, estimated to cost about \$4,000,000. It will include machine shop, foundry, automobile shop, etc. Work will commence at once. E. S. Gordon, 125 Sibley Building, is architect.

The vocational department, chemical laboratory and other portions of the high school at Fine Avenue and Fortage Road Niagara Falls N. Y. were destroyed by fire Jan. 24, with loss estimated at \$700,000 of which about \$100,000 represents equipment. The Board of Education will prepare plans for rebuilding the structure.

The Morsely Machinery Co. Rochester N. Y. comprising a merger of the W. A. Wilson Machine Co. and the Rochester Boiler Works has acquired a plant at 79 1/2 St. Paul Street formerly occupied by the Distance Check Writer Corporation and will manufacture planers, special machinery and parts.

The Board of Supervisors Buffalo has authorized Thomas H. McElroy County purchasing agent to purchase a new steam roller for road work. Bids will be called at once. Machine for a municipal asphalt plant will be purchased at the same time. An appropriation of \$5,000 has been made for the plant.

Chicago

CHICAGO Jan. 30

January proved a better month for local houses than December. One dealer in fact states that if business is as good during the succeeding months of 1922 he will be able to keep red figures out of his books. Current buying is principally confined to individual machines and a good proportion of current orders is for second hand equipment. Notable among orders recently placed may be mentioned three used 14 in. boring mills, one new 42 in. boring mill, two new 12 in. gear cutters and one new 22 in. x 10 ft. engine lathe. Business is coming from miscellaneous sources and while no one class of consumers stands out prominently it is to be noted that automobile accessory manufacturers seem to have taken a new lease on life and are placing some orders for machine tools and supplies. As a whole pending railroad bids are still held in abeyance. The Santa Fe however has placed orders for a large boring mill, an axle lathe and a steam hammer and has put out an inquiry for three motor driven internal and external tool post grinders. The American Steel Foundries is in the market for a No. 11 Cincinnati cutter and tool grinder.

The Consumers Power Co. Jackson Mich. has bought a 20 ton overhead electric traveling crane for its Roger Dam plant near Grand Rapids.

The Cicero Chicago Corrugated Co. 111 South Fifty First Court Cicero Ill. has let a contract for the reconstruction of its one story plant 130 x 130 ft.

The Vienna Model Bakery Co. 1010 Vermont Ave. Chicago, is receiving bids on a three story plant 172 x 140 ft. to cost \$150,000.

The municipal commission Hibbard Minn. is considering plans and specifications for in addition to it light and water plant to cost \$150,000.

I. W. Leitch has opened a machine shop at 22 West Main Street, Rolla Mo. He will specialize on small machine and automobile parts.

The Gray Iron Foundry Co. and the Adams Heating Co. Muskegon Mich. have merged under the name of the Gray Iron Foundry & Furnace Co. J. F. Meier will be president and the other officers have not yet been named.

The American Traction Corporation Toluca Ill. was recently incorporated with \$50,000 capital stock to take over the assets and properties of the Automotive Radiator Corporation and several other smaller plants. It is now constructing a plant 17 x 180 ft. and expects to purchase stamping machinery and presses, sheet metal tools and a general line of machine shop equipment. The company is at present manufacturing automobile radiators both for replacement and for the equipment of all makes of cars and is also producing various other mechanical and metallic parts for automobiles. The officers are Phil J. Sperry, president, John W. Schull, treasurer and George C. Anderson, secretary. The Chicago office is at 119 21 West Van Buren Street.

The Astell Auto Accessories Co. 1707 Michigan Boulevard Chicago was recently incorporated with \$24,000 capital stock. The company's business consists principally of the jobbing of automobile accessories, motor parts and garage equipment. Its manufacturing operations are confined to a line of special bodies for Ford and Chevrolet automobiles. The officers are Joseph E. Astell, president and Charles L. Runyan, secretary.

The Roger Dam Power Plant of the Consumers Power Co., Grand Rapids Mich. which was recently destroyed by fire, will be replaced at a cost of \$150,000. Work will begin as soon as the insurance is adjusted and plans provide for equipment with 50 per cent greater capacity than that of the old plant.

The Illinois Traction System contemplates the construction of a large electric power generating plant at Decatur, Ill.

according to an announcement by H. E. Chubbuck, general manager. Plans for the erection of the plant, he said, are contingent on securing permission from the city to use water for condensing purposes from a new artificial lake at Farley Park. Preliminary estimates place the cost between \$600,000 and \$1,000,000.

The D. V. Reedy Elevator Co., manufacturer of passenger elevators, Indianapolis plans to construct a two-story factory, 44 x 202 ft., at 520-522 South New Jersey Street, at a cost of \$35,000.

The city of Ottumwa, Iowa, contemplates the erection of a \$600,000 hydroelectric power plant. Permission to dam the Des Moines River near Harvey has been granted by the United States War Department.

The city of Centralia, Ill. has awarded contract for a pumping station and the installation of other equipment including the laying of a 14 in. pipe line to the Beeson Machinery Co., Kansas City, Mo.

The J. L. Ferguson Co., a newly organized corporation to manufacture labor saving package machinery, has leased the former plant of the Quaker Oats Co. at Railroad and Shelby streets, Joliet Ill. At present 30 men are at work in the plant and this number will be gradually increased. Others connected with the company besides J. L. Ferguson, the president are L. R. Montgomery, sales manager and E. H. Bari, superintendent.

The State Board of Regents Pierre N. D. T. W. Dwight, president will commence the erection early in March of its new power plant at the State College of Agriculture and Mechanical Arts, Brookings N. D. H. F. Berg, Pierre is State engineer.

A vocational department will be installed in the new high school at Scottsbluff Neb. plans for which are being prepared by H. A. Bradley & Co. Hastings Neb. architects. The total cost is estimated at \$500,000.

The Western Electric Co. 500 South Clinton Street Chicago manufacturer of telephone and other electrical equipment is planning for the early installation of machinery in the new building now being completed at its plant at Hawthorne near Chicago. The structures represent an investment of close to \$2,000,000 and the machinery to be installed will approximate \$1,500,000.

The Pendergast Implement Co. Bemidji Minn. manufacturer of agricultural implements etc. is planning for the erection of a two or three story building 6 x 125 ft. estimated to cost about \$60,000.

The Commonwealth Edison Co. 2 West Adams Street Chicago has filed plans for a new one story power house 25 x 18 ft. at 5747 Lowe Avenue.

The Board of Education Fremont Neb. is taking bids until Feb. 20 for a three story junior high school 101 x 160 ft. to include a vocational department estimated to cost about \$200,000. The A. H. Dyer Co. Fremont is architect. S. S. Sidner is chairman of the school board.

G. C. Brown and W. C. Gridley 1828 Hoffman Boulevard Rockford Ill. are taking bids for a new one story machine and repair shop, 35 x 60 ft. one story power house 2 x 30 ft. and one story main automobile service works 60 x 14 ft. estimated to cost close to \$80,000. C. D. Woolley 610 Stewart Building is architect.

New England

Boston Jan. 30

Sales of machine tools in the past week have been comparatively small although they include a few large and costly machines. Sentiment among the manufacturers of metal working equipment and sales representatives has taken a pronounced turn for the better however. In individual instances it borders on optimism and is based on several constructive facts. Preliminary estimates disclose bookings well above those for December and compare favorably with the November record. Additional prospects have developed the past week most of them involving small amounts of equipment but having all earmarks of being urgent requisitions. Some of the more important inquiries on which prices have been put give strong evidence of maturing within the next fortnight and other concerns have given assurances that the needed funds for required single machines will shortly be forthcoming. In the aggregate inquiries for new machines equal those for used. Heretofore used tools have led in activity. Small shops, for the first time in months are busier and in quite a few cases have taken or are about to take on additional machinists. Many of the larger industrial plants are gradually increasing outputs although still operating well below normal.

A Westfield Mass. manufacturer of heaters is planning to start an experimental shop, and is inquiring for about

\$25,000 worth of equipment. The list includes a boring machine, planing, upright drilling, turning and other equipment. The Maine Central Railroad is inquiring for three tools, one of which is a large driving wheel lathe. This inquiry has no connection with the one sent out last September, which apparently has been abandoned. A local representative of a lathe manufacturer contemplates closing next week with a nearby manufacturer on a 16-in. x 10 ft. lathe, and has more than half a dozen inquiries on smaller turning tools. A New England maker of pumps has closed for a large horizontal drill, and signifies an intention of doing likewise on a special four-spindle drill and large lathes in the immediate future. A new company to manufacture power equipment is scheduled this week to close on a fairly large list of metal-working equipment involving new and used machines. As near as can be estimated there are 30 other inquiries, varying in size and value, that give promise of being closed in February. It is upon this comparative activity, and the more encouraging industrial outlook that the machine tool trade is basing expectations.

Sales the past week include an 11,000-lb. new power press and a used 500-lb. power hammer to a South Boston manufacturer, who contemplates additional equipment purchases; a new 8-in. surface grinder to a maker of electrical equipment; bulldozer or bending machine, a large punch and shear, all new equipment, to a central Massachusetts interest; one 16-in. x 10-ft. gap lathe to a Hyde Park, Boston, manufacturer, and a 9 x 4-ft lathe to a local garage. Dealers in used equipment report prices as firmer. The only developments regarding prices on new machine tools are confirmations received from some Western manufacturers verifying lists issued in October and November.

Rockwell & Sherwin, Elm Street, Brattleboro, Vt., carriage manufacturers, have leased their plant to the Roberts Auto Co., and will retire from business. The automobile company will conduct a service department.

The Segal Metal Products Co., Springdale, Stamford, Conn., has awarded contract for a one-story, 45 x 81 ft foundry to replace one recently destroyed by fire.

The Wallingford Steel Co., Wallingford, Conn., a new organization, contemplates the erection of three plant units, 100 x 130 ft., 50 x 100 ft., and 100 x 300 ft., respectively, on the east side of Quinnipiac River. Rolling mill equipment will be installed.

George U. Ladd, Worcester, is president, and George D. Morse, treasurer of the G. U. Ladd Co., recently incorporated under the laws of Massachusetts to manufacture pumps and steam devices. Details regarding production have not yet been worked out.

The plant formerly occupied by the Consolidated Motor Co., Middlefield, Conn., has been sold to the National Auto Stores Co., New Haven, Conn. It will be ready for operation before spring.

The Great Northern Paper Co. is completing at Greenville, Me., a 116 x 226 ft. plant containing a machine shop, wood-working shop, repair and paint shops, tool and stock rooms.

Richard H. Long, Framingham, Mass., states that the plant erected by him on Millbrook Street, Worcester, will be used for the manufacture of automobiles. Equipment requirements have not been made public.

Improvements are being made at the plant of the American Brass Co., Torrington, Conn., including the installation of electric furnaces and the changing over from steam to electric shop power.

The interests which recently acquired the Harley Co., Springfield, Mass., foundry and drop forging properties from motorcycle interests of that city have received an order for \$150,000 worth of maintenance accessories from a large Eastern railroad. Plans call for extensions and improvements in the near future, with possibilities of machine tool purchases.

The Kress Carriage Co., Concord Street, Lawrence, Mass., manufacturer of automobile bodies, etc. will build a two-story addition, 45 x 93 ft.

A vocational department will be installed in the new high school to be erected at Winchester, N. H., estimated to cost about \$50,000. Clarence Hoyt, 8 Beacon Street, Boston, is architect.

The J. L. Anthony Co., 161 Dorrance Street, Providence, R. I., manufacturer of metal specialties, jewelers' findings, etc., has awarded a contract to Mahoney & Tucker, 72 Weybosset Street, for a new one-story plant, 55 x 130 ft.

Work has been commenced on a new high school at Stoughton, Mass., with vocational department, estimated to cost about \$125,000. E. F. Leonard is chairman of the Stoughton School Board.

The Rhode Island Fittings Co., Hillsgrove, R. I., manufacturer of metal fittings, etc., has awarded a contract to

Carl E. Carlson, 142 Atlantic Avenue, Providence, R. I., for a new one-story plant, 65 x 260 ft., on Narragansett Avenue.

Officials of the Potter & Johnston Machine Co., Pawtucket, R. I., manufacturer of automatic machinery, have organized the Potter Fine Spinners, Inc., with capital of \$800,000, and contemplate the erection of a new plant in the vicinity of the present works. The company is headed by James C. Potter and John Johnston, president and treasurer, respectively, of the Potter & Johnston company.

A vocational department will be installed in the new two-story high school to be erected at Palmer, Mass., estimated to cost about \$150,000. Morris W. Maloney, 146 Chestnut Street, Springfield, Mass., is architect.

A one-story power house, 40 x 50 ft., will be built in connection with a new industrial plant, 156 x 201 ft., at New Haven, Conn., plans for which are being prepared by Dwight F. Smith, Liberty Building, architect. The owner's name will be announced at an early date. It will cost about \$100,000.

A vocational department will be installed in the new junior high school to be erected at New Haven, Conn., site for which will be purchased at an early date. Local architects have been asked to submit competitive plans.

Pittsburgh

PITTSBURGH, JAN. 30.

The United Engineering & Foundry Co., Pittsburgh, has closed for a 15-ton crane with 5-ton auxiliary which is the first of several cranes the company will buy in connection with the enlargement of the Frank Kneeland works. The Cleveland Crane & Engineering Co., Wickliffe, Ohio, through its Pittsburgh office has been awarded a 5-ton, 37-ft. span special low-head crane by the Elliott Co., Jeannette, Pa. These sales constitute the only crane business of the past week and in both instances old rather than new business was represented. In new business, the crane market in this district has not been so dull in several years. Several manufacturers' representatives state that they have had no new inquiries in more than a month and quotations put out have been for estimating purposes rather than against real prospects. The Allis-Chalmers Mfg. Co., Milwaukee, has been awarded a 48 x 60-in. twin tandem 3300-kw. blast furnace gas engine electric unit by the National Tube Co., for its Lorain, Ohio, works. Machine-tool activities are extremely small and sales out of dealers' stocks also have decreased in the past week. The West Penn Steel Co., Brackenridge, Pa., is said to be in the market for a couple of key-seating machines, but having only occasional use for them it is believed that used, rather than new machines will be bought.

The Pack & Lindsay Co., Sandusky and Robinson streets, Pittsburgh, manufacturer of railroad and mine equipment, is completing excavations for the erection of its proposed addition, estimated to cost about \$90,000.

The Jeffrey-DeWitt Insulator Co., Kenova, W. Va., has been organized with a capital of \$800,000, as a subsidiary of the Jeffrey-DeWitt Co., Detroit, to operate a local plant for the manufacture of electrical insulation products. M. L. Burnett and J. S. McNeer, both of Huntington, W. Va., are among the incorporators.

The Board of Education, Princeton, W. Va., will take bids in February, for a new two-story and basement high school, 66 x 190 ft., to include vocational department, estimated to cost about \$150,000. J. V. Woodson is president of the board. Wysong, Tufts & Jones, Princeton, are architects.

A vocational department will be installed in the new high school to be erected by the Slab Fork District School Board, Statesbury, W. Va., plans for which have been completed.

Detroit

DETROIT, JAN. 30.

The Rich Steel Products Co., Battle Creek, Mich., has reincorporated with a capital of \$3,500,000 and will soon start production of automobile parts. It will build an extension to take care of the additional business, and will probably double the present working force of 350 men.

The Superior Combustion Engine Corporation, Detroit, will start production of a new type of heavy duty internal combustion engine as soon as manufacturing facilities can be procured. The company is backed largely by Detroit capital and includes a number of prominent Detroit business men among its officers and directors. Announcement of its personnel and plans will be made in a short time.

The Citizen's Light & Power Co., Adrian, Mich., will proceed immediately to double the capacity of its plant.

A turbine generator of 2,000-kw. capacity and additional boilers will be purchased.

The Michigan Crown Fender Co., Ypsilanti, Mich., has purchased the Jackson Stove Co., Jackson, Mich., and will move the plant to Ypsilanti. It will manufacture oil stoves, heaters and ranges with its regular line.

The Gratiot Mining Co., Calumet, Mich., has plans under way for a new power house at its properties.

The Motor Wheel Corporation, Lansing, Mich., will defer until March the erection of its new one-story and basement plant, 120 x 210 ft., contract for which was awarded recently to the H. G. Christman Co.

A vocational department will be installed in the two-story and basement high school to be erected at Mt. Clemens, Mich., estimated to cost about \$200,000. Plans are being prepared by T. Van Damme, 14 North Front Street, architect.

The Kalamazoo Ice & Fuel Co., 113 East Kalamazoo Street, Kalamazoo, Mich., is completing plans and will call for bids early in February for a new ice manufacturing plant. George R. Bright, 103 Marquette Building, Detroit, is architect. Benjamin Steel is secretary and treasurer.

The Village Council, Union City, Mich., is completing plans for a municipal hydroelectric power plant to cost about \$150,000. John L. Moore is president. Holland, Akerman & Holland, Ann Arbor, Mich., are engineers.

Cincinnati

CINCINNATI, Jan. 30.

The past week the machinery market showed an improvement over the previous one. While a number of fair-sized inquiries are still being figured on, most of the orders placed were for single tools, with the exception of an order for approximately 40 machines booked by a local manufacturer from an automobile maker. This is one of the largest orders placed locally for some time. The inquiry from Japan for 15 lathes, mentioned last week, is still active, and in addition several local manufacturers are in receipt of single orders for lathes and drilling machines from the Far East. Very little railroad business is offering at present, although local manufacturers are participating in some of the business recently placed. Altogether, the sentiment in the trade is much more optimistic and orders booked in January, with most manufacturers, will be the best for many months.

The Precision Truing Machine & Tool Co., 25 East Third Street, Covington, Ky., has purchased the plant and equipment of the Chicago Steel & Valve Co. and has moved it to Covington, where production of the Ross-Murray truing tool will be continued in connection with the devices now being made by the company. The Precision company recently moved its plant from 407 Madison Avenue to its present location and is now completely equipped for production.

The city of Hamilton, Ohio, is preparing to rebuild its electric lighting plant at a cost of about \$650,000. The Froehlich & Emory Engineering Co., Toledo, Ohio, is engaged in preliminary surveys preparatory to submitting cost estimates and complete plans which are expected to be ready on May 1.

The Dayton Steel Racquet Co., Dayton, Ohio, has been incorporated with a capitalization of \$200,000 to manufacture steel tennis racquets. W. A. Larned, noted tennis player, is president of the company. The company will at present carry on manufacturing operations at the plant of the Dayton Pneumatic Tool Co., Miami Chapel Road, Dayton.

The Murphy Valve Co., Columbus, Ohio, has been incorporated with a capitalization of \$50,000 to manufacture a valve invented by Daniel R. Murphy, Newark, Ohio. Offices have been opened in the Majestic Building, Columbus, and plans are being completed for the production and distribution of the product.

The Norton-Broadway Machinery Co., 238 Broadway, Cincinnati, is making inquiries for a number of water-tube boilers, Babcock & Wilcox type, of about 200-hp. rating.

Baltimore

BALTIMORE, JAN. 30.

The American Ice Co., Calvert Building, Baltimore, has acquired a site on Register Street, for a new ice manufacturing plant, estimated to cost about \$50,000.

The Citizens' Improvement Association, Riverdale, Md., is considering the erection of a municipal electric lighting plant. Dr. J. S. Caldwell is president.

The American Oil Co., American Building, Baltimore, is perfecting plans for a new plant to cost about \$200,000, including equipment. A number of steel tanks will be built for the storage department. Louis Blaustein is manager.

The Eastern Shore Gas & Electric Co., Salisbury, Md., is planning for extensions and improvements in its electric power plant and system, and has arranged a budget of \$600,000, for work during the next 24 months, of which amount \$200,000, will be expended this year.

M. L. Himmel & Son, 107 North Frederick Street, Baltimore, manufacturers of store fixtures and equipment, have awarded contract to John Kunkel, 29 South Linwood Avenue, for an addition and improvements estimated to cost about \$35,000.

The Chamber of Commerce, Wilmington, Del., is negotiating with the Clark Vending Machine Co., capitalized at \$100,000, and headed by Dr. V. K. Clark, relative to the establishment of a plant to manufacture a new type of package vending machine, electrically operated. Consideration is being given to the plant of the Artillery Fuse Co., South Wilmington, which has been idle for more than two years. The proposed works will give employment to more than 500 men.

The Pomona Terra Cotta Co., Greensboro, N. C., has broken ground for the erection of a new unit, to be known as Plant No. 4, comprising a main four-story building, 70 x 225 ft., with adjoining structure, 30 x 50 ft., estimated to cost about \$100,000, including machinery. It will be equipped for the manufacture of pipe and kindred products. W. C. Boren, Jr., is secretary and treasurer.

The Chamber of Commerce, Atlanta, Ga., is considering plans for the establishment of a factory to manufacture wire door mats and kindred products. A company will be formed to build and operate the works. Frank Weldon is acting secretary.

The Market Engineering & Development Co., 1606 Candler Building, Atlanta, Ga., is arranging for the construction of a new refrigerating plant to cost \$50,000. A cold storage plant will also be built. Roberts & Co., Atlanta, are architects and engineers.

The Reedy River Power Co., Laurens, S. C., is taking bids for its proposed new steam-operated electric power plant, two-stories, 50 x 65 ft., and estimated to cost about \$100,000, including equipment. The J. E. Sirrine Co., Greenville, S. C., is engineer in charge.

A vocational department will be installed in the new two-story and basement high school to be erected at Lincolnton, N. C., plans for which are being prepared by James A. Salter, Raleigh, N. C., architect.

The Common Council, Hagerstown, Md., is having plans completed for its municipal electric light and power plant and will call for bids in the spring. A. B. Grubmeyer, 21 East Franklin Street, is engineer.

Plans are being completed by the Board of Education, Tarboro, N. C., for a two-story high school, to include a vocational department. Charles C. Hook, 207 Trust Building, Charlotte, N. C., is architect.

The Gullford Building Co., Fidelity Building, Baltimore, is constructing a public garage and repair shop at Calvert and Thirty-fourth streets, 50 x 122 ft.

The American Concrete Tie & Products Co., Gaither Building, Baltimore, has been organized and plans to build a factory for the manufacture of concrete products. J. W. Ritter is secretary.

Cleveland

CLEVELAND, Jan. 30.

The local machine tool market improved somewhat during the week. The Arvac Mfg. Co., Anderson, Ind., continued its buying, placing orders for 20 small manufacturing lathes and three turret lathes. A Cleveland manufacturer of drilling machinery reports an improvement in orders from the East. The Cleveland Heater Co. purchased a used press of 1000-ton capacity. The Zigler Mfg. Co., Alexander, Ind., is said to be in the market for about a dozen machines. The Cleveland Board of Education is inquiring for eight machines, all wood-working but two.

Machinery disposed of at auction from the Cleveland plants of the Standard Parts Co. last week brought low prices. There were 115 machines sold, mostly to dealers. A considerable part went to Chicago and Pittsburgh dealers. The list included 36 engine and turret lathes, 12 automatic screw machines, 25 milling machines, 30 grinders and 12 milling machines.

Old machines brought comparatively better prices than fairly good used tools. Some of the selling prices of machines in good condition were as follows: Brown & Sharpe and Becker milling machines, \$225 to \$225; large Brown & Sharpe milling machine, \$600; La Blond universal milling machine, \$900; Warner & Swasey 3A turret lathes, \$580; automatic screw machines, \$350 to \$375.

The Wheeling Steel Corporation has sent out its inquiry

for about a dozen traveling cranes that will be required in connection with its plant extensions.

The Cleveland Board of Education has issued a list of equipment for the West Technical High School for which bids will be received Feb. 13. The list, which calls for motor-driven machines, includes:

- One band sawing machine.
- One 18-in. hand planer and jointer.
- One 30-in. single surface planer.
- One double arbor universal saw bench.
- One universal revolving oil stone tool grinder.
- Two wood turners.
- One combined band saw setting and filing machine.

The Foote-Burt Co., Cleveland, manufacturer of drilling machines, has purchased the assets and business of the Bell Washer & Wringer Co., Cleveland, manufacturer of electric washing machines. The Foote-Burt Co. for some time has been manufacturing these machines for the Bell company.

Mechanical equipment aggregating in excess of \$800,000, according to the architect's estimate, will be required in the erection of new Medical School buildings for the Western Reserve University of Cleveland. The principal items of mechanical construction are \$530,000 for the Medical School and \$261,000 for power house equipment.

The Gartland & Carroll Foundry Co., Sandusky, Ohio, which has been operated as a partnership, has been incorporated. No change will be made in the management.

The Scott & Son Fan Co., Martins Ferry, Ohio, has purchased the plant of the South Zanesville Gear & Woodwork Co., Zanesville, Ohio, and will move to its new quarters shortly. It manufactures ventilating fans and heating systems.

The proposed merger of the Kelley Island Lime & Transport Co., Cleveland, and the Dolomite Products Co., Maple Grove, Ohio, which was recently announced to have been effected has been declared off according to official announcements made by representatives of these two companies.

The Akron General Japanning Co., Akron, Ohio, incorporated with a capital stock of \$50,000, has established a japanning plant at Thornton and Nathan streets.

The Standard Parts Co., Cleveland, has taken an order from the Wills Sainte Clair Co. for 5000 sets of automobile axles, approximating \$1,000,000, deliveries of which will start in March and extend over several months.

The Mueller Electric Co. 2143 Fairmount Road, Cleveland, manufacturer of electrical products has completed plans for the erection of a new one and two-story plant, 65 x 95 ft., on East Thirty-first Street, to cost about \$50,000. G. S. Rider & Co., Century Building, Cleveland, are architects.

A vocational department will be installed in the three-story and basement senior high school, 200 x 300 ft., to be erected at Mansfield, Ohio, estimated to cost about \$800,000. Plans are being prepared by Althouse & Jones, Market House, West Fourth Street, architects.

The Board of Education, Canton, Ohio, is arranging for the installation of equipment in the vocational department at the new McKinley high school.

Indiana

INDIANAPOLIS JAN. 30

The Martin-Perry Co., Indianapolis, manufacturer of automobile bodies, with headquarters at York, Pa., has leased property at St. Louis, for the establishment of a new assembling and operating plant. The Indianapolis works will devote a large part of production to truck bodies for the Willys-Overland Co. Chapin Spahn is general manager.

The Evansville Structural Supply Co., Evansville, Ind., is planning the erection of a new one-story steel fabricating works 100 x 200 ft., to be operated in conjunction with its present iron and steel plant. It is estimated to cost about \$40,000.

The Indianapolis Light & Heat Co., 48 Monument Place, Indianapolis, will commence the immediate erection of a new one-story power house addition, 63 x 90 ft., estimated to cost about \$42,000.

A vocational department will be installed in the two-story and basement high school to be erected at Farmersburg, Ind., bids for which are being taken until Feb. 7. It will cost about \$50,000, exclusive of equipment. Johnson Miller & Miller, 105 South Seventh Street, Terre Haute, Ind., are architects.

Fire, Jan. 23, destroyed the plant of the Keene Mfg. Co., Crothersville, Ind., manufacturer of toys, with loss estimated at about \$30,000. Tentative plans are under consideration for the erection of new works with increased capacity, estimated to cost \$100,000.

The Carbon Fire Brick & Coal Co., 346 Lemeke Annex

Building, Indianapolis, is considering preliminary plans for the erection of a new fire brick and refractory plant at Carbon, Ind., estimated to cost \$150,000, including equipment.

A vocational department will be installed in the two-story high school to be erected at North Manchester, Ind., 70 x 120 ft., and estimated to cost about \$150,000. Bids will be asked early in the spring. Plans are being prepared by Charles H. Weatherhogg, Citizens' Trust Building, Fort Wayne, Ind.

The Central South

ST. LOUIS, JAN. 30.

The Acme Brass & Machine Works, 1628 Oak Street, Kansas City, Mo., has completed plans for a two-story machine shop, 25 x 115 ft., at 609 East Seventeenth Street, and will commence work at once.

The Hall & Brown Woodworking Machinery Co., 1913 North Broadway, St. Louis, is completing plans and will call for bids in March for its proposed addition and improvements in the present works. The estimated cost is \$50,000. Preston J. Bradshaw, International Life Building, is architect.

A four story automobile service and repair building, 100 x 160 ft., estimated to cost about \$300,000, will be erected on St. Charles Street, St. Louis, by the Scruggs, Vandervoort & Barney Dry Goods Co., Ninth and Olive streets, St. Louis, for company trucks and automobiles. Bids will be asked at once.

The American Asphalt Roof Corporation, Kansas City, Mo., manufacturer of prepared roofing products, will make enlargements in its plant to cost about \$50,000.

Fire, Jan. 18, destroyed a portion of the oil refinery of the El Dorado Oil & Pipe Line Co., El Dorado, Ark., with loss estimated at \$30,000. The plant will be rebuilt.

The Appalachian Marble Co., Middlebrook Pike, Knoxville, Tenn., will build a one-story addition, 200 x 210 ft., to double the present capacity. New polishing, trimming and other machinery will be installed. The extension will cost about \$150,000, including equipment. T. J. Deane is secretary and treasurer.

The Joplin Zinc Products Co., Joplin, Mo., will soon take bids for a new plant to manufacture zinc shingles and kindred products. R. E. Love, 1531 East Seventh Street, is architect.

A vocational department will be installed in the new two-story and basement high school to be erected at Hoxie, Kan., 67 x 125 ft. S. S. Voigt, room 610, Fourth National Bank Building, Wichita, Kan., is architect.

The Kansas City Cold Storage & Warehouse Co., Kansas City, Mo., recently organized as a subsidiary of the United States Cold Storage Co., West Thirty-ninth Street and Hoyne Avenue, Chicago, has acquired over 140,000 sq. ft. for a new cold storage and refrigerating plant, estimated to cost about \$3,000,000 with machinery.

The Southland Motor & Body Corporation, Jacksonville, Tenn., recently formed with a capital of \$250,000, will operate a local plant to manufacture automobile bodies. It will approximate about 220,000 sq. ft., and equipment will be provided to develop a daily capacity of about 200 complete bodies. C. L. Williams is president and Joseph S. Boyd, secretary.

W. J. Barnhill & Co., Madisonville, Ky., will take bids during February for a two-story machine and repair shop, 60 x 160 ft., primarily for automobile work. John T. Waller, Hopkinsville, Ky., is architect.

A vocational department will be installed in the two-story and basement high school, 85 x 134 ft., to be erected at Jewell, Kan., estimated to cost about \$85,000. Plans are being drawn by Mann & Gerow, Rorabaugh-Wiley Building, Hutchinson, Kan. H. A. Noble, room 411, Reliance Building, Kansas City, Mo., is structural engineer.

The Gray Knox Marble Co., Knoxville, Tenn., is considering plans for enlargements in its plant, to cost about \$200,000, including machinery.

The Ryan Motor Co., Tulsa, Okla., has leased a two-story and basement building, 150 x 300 ft., to be erected on South Main Street by Frank R. McCullough and associates, First National Bank Building, to cost about \$150,000. It will be equipped for a general automobile works, including repair and service departments. Stone, Walters & Deegan, 234 Kennedy Building, are architects.

The American Commercial Car Co., Gratiot and French streets, Detroit, manufacturer of automobiles, has acquired a building at Knoxville, Tenn., for a branch plant. It will be enlarged to approximate 10,000 ft. of floor space. A complete body manufacturing works will be installed.

G. W. North and C. S. Cleaver, Deming, N. M., are organizing a company to build a plant to manufacture auto-

matio-hay balers and other farm machinery. Employment will be given to more than 500.

The Board of Education, Muskogee, Okla., is planning the erection of a two-story addition to the manual training high school, estimated to cost about \$50,000. H. O. Valeur & Co., 705 Manhattan Building, are architects. E. D. Cave is clerk of the board.

The City Council, St. Charles, Mo., is perfecting plans for a bond issue of \$235,000 to build a municipal electric light and power plant. A site has been selected.

The University of Missouri, Columbia, Mo., will receive bids Feb. 24 on a power plant building, including smoke stack, tunnel, boilers and stokers, traveling crane, steam and water mains, piping, etc. Applications for plans and specifications may be made to Edward E. Brown, business manager, Columbia, Mo. Deposit required, \$10. Other buildings to be erected, plans now in preparation, are agricultural, chemistry, women's gymnasium, medical extension hospital and mechanic arts buildings at a total estimated cost of \$800,000.

Milwaukee

MILWAUKEE, Jan. 30.

New business is beginning to slimmer through in slowly increasing volume, but trade is still decidedly spotty and spasmodic. Prospects for February are considered encouraging, judging by inquiries which developed the past 10 days. The automotive parts industry has been favored with some good orders the last week or two. Outside of placing an order here and there for one or two tools, the railroads have not yet come into the market to any large extent. Sentiment among manufacturers as well as dealers is that the next quarter should develop a moderate call for equipment from a wide range of industries. Makers of road construction and maintenance equipment have recently booked large municipal orders which will shortly be supplemented by orders from contractors.

The Bucyrus Co., South Milwaukee, Wis., manufacturer of steam shovels, drag-line excavators, cranes and dredges, has engaged Frank D. Chase, Inc., 654 North Michigan Avenue, Chicago, to design and erect a brick and steel foundry, 60 x 276 ft., estimated to cost \$125,000 complete. P. J. Nordstrom is general superintendent.

The Heating & Power Appliance Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture heating and power devices and appliances. The incorporators are Edmund C. Rosenberg, 603 Caswell Block; Joseph Eder, 470 Tenth Street, and Frank L. Hutchinson, 425 East Water Street, a heating and power engineer.

The Forster Foundry Co., Menominee, Wis., recently incorporated with \$10,000 capital stock, has taken over the plant and business of the Actua Engine Works, of the same city, which manufactures iron, brass and aluminum castings and coal chutes, sleigh shoes, sandscreening machines, fire escapes, etc., having also a welding and cutting department. The shops aggregate 20,000 sq. ft. of floor space. The ownership remains unchanged. H. H. Forster, one of the founders of the business in 1898, is president; Samuel H. Forster, vice-president, and George B. Forster, secretary and treasurer. Some improvements in the plant are contemplated, but for the present no additions will be made.

The Rautbrod Mfg. Co., Milwaukee, has been granted a charter to manufacture machinery, tools, dies and hardware specialties. The incorporators are Zebulon Rautbrod, 810 Galena Street; Louis O. Laverenz, 747 Buffum Street, and J. A. Uttecht. Mr. Rautbrod has conducted a small shop for several years which the incorporation expects to develop.

The Board of Education, Lancaster, Wis., has engaged Parkinson & Dockendorff, architects, LaCrosse, Wis., to prepare plans for a new high school to cost between \$175,000 and \$200,000, with provision for manual training. Bids probably will be taken about March 15 or April 1. F. J. Sanville is secretary of the board.

The Drophead Projector Co., Fond du Lac, Wis., manufacturer of portable motion picture projecting machines, has issued \$40,000 additional stock to finance enlargement of production. A small quantity of tools will be purchased. Charles Fitz is general superintendent.

The C. J. Atkinson Co., 244 Fourth Street, Milwaukee, has incorporated its business without change of style, with a capital stock of \$10,000. Cyril J. Atkinson, founder of the business, becomes president, treasurer and general manager. It does a general business in metallurgical engineering, chemical analysis, etc.

The Parelskin & Weinreis Co., Milwaukee, has been organized with a capital stock of \$15,000 to buy, sell and generally deal in used machinery and factory equipment. The incorporators are M. A. Weinreis, Arthur J. Nelson and Samuel N. Parelskin, 533 Twenty-ninth Street.

Seattle

SEATTLE, Jan. 31.

The Threshers Inserted Tooth Cylinder Co., Spokane, Wash., recently organized with a capital of \$100,000 to manufacture special threshing machines, is arranging for the early establishment of a local plant. The company is headed by I. O. Brock, New Madison Hotel, Spokane, and the inventor of the machine.

The Laurel Box Co., White Salmon, Wash., is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at about \$45,000.

The Idaho Power Co., Boise, Idaho, has arranged for an appropriation of \$200,000 for extensions and improvements in its electric power plant and system in the Boise and Mountain Home districts.

The Coy Valve Co., Chehalis, Wash., is perfecting plans for a new factory to manufacture valves and other steam specialties. Work will commence at an early date. W. Graham heads the company.

The Three Rivers Light & Power Co., Reedsport, Ore., recently organized, has taken over a local electric power plant and plans for extensions and the installation of new equipment. The company is headed by Stanley D. Chapin and J. R. Browne, Reedsport.

The Colby Compression Tube Co., Portland, Ore., has purchased property at East Third and Burnside streets, and has plans under way for a factory to manufacture inner tubes.

The Common Council, Nampa, Idaho, is arranging for the construction of a municipal electric light and power plant.

California

SAN FRANCISCO, Jan. 24.

The Santa Fe Railway Co., Los Angeles, will take bids at once for a one-story addition to the machine shop at San Bernardino, Cal., 65 x 510 ft. It will be equipped with a traveling crane. The shop with equipment will cost about \$300,000. The engineering department of the company, Kerkhoff Building, Los Angeles, is in charge.

The Ontario Power Co., Ontario, Cal., is contemplating the erection of a new power plant in the San Antonio Canyon section, to cost about \$50,000.

A vocational school will be established by the Board of Education, Reedley, Cal., in connection with a union high school. The project will cost about \$450,000. Plans are being prepared by Norman F. Marsh, 210 Broadway Central Building, Los Angeles, architect.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will make extensions and improvements in its electric power plant and system in the vicinity of Turlock, Cal., to cost about \$110,000. It is also considering the erection of a new power house at Martinez, Cal., to cost approximately \$200,000.

The Union Ice Co., Napa, Cal., has completed arrangements for a new ice-manufacturing plant to cost about \$60,000.

The Pacific Meter Works, San Francisco, a branch of the American Meter Co., 105 West Fortieth Street, New York, has leased a two-story building at 1123 Harrison Street, San Francisco, to manufacture gas meters and parts. Production will be primarily for export trade. E. W. Hammond will be local manager.

The Pacific Autoplane Co., Figueroa Street, Los Angeles, manufacture of automobile parts, airplanes, etc., is arranging for the erection of a new plant to cost about \$35,000. W. J. Waters is chief engineer.

The Gulf States

BIRMINGHAM, Jan. 30.

The Department of Public Finance, New Orleans, R. M. Murphy, commissioner, will install an electric traveling crane and electrical generating equipment in connection with the new municipal incinerator plant, bids for which are being taken until Feb. 6. John Klorer is city engineer.

The City Council, Abbeville, La., has arranged for the immediate construction of a municipal electric light and power plant. Henry A. Ments, Magnolia, Miss., is consulting engineer. R. P. LeBlanc is mayor.

The Patton Cement Co., Rotan, Tex., recently organized, has completed plans for its proposed new works on a site about a mile from the city. Ground will be broken in February. It is estimated to cost about \$350,000, including machinery.

The Cisco & Northeastern Railroad Co., Cisco, Tex., has

arranged for a loan of \$380,000, the proceeds to be used for extensions and betterments, including the enlargement of car and locomotive shops, and the installation of additional equipment, etc. R. Q. Lee is president.

The Alexandria Welding Works, Alexandria, La., is planning for the establishment of a new factory at Sixth and Lee streets. W. D. Worthington is president.

The Common Council, Livingston, Tex., is considering plans for rebuilding the municipal electric light and power plant, destroyed by fire, Jan. 9. The plant is operated by the Livingston Mfg. Co.

The Water & Sewerage Board, 526 Carondelet Street, New Orleans, is taking bids until March 20 for electrical equipment, boilers, and electrically-operated centrifugal pumping machinery for the water-works department. A. G. Hoffat is secretary.

The Wichita Falls Foundry & Machine Co., Wichita Falls, Tex., has purchased property at Railroad and New York avenues, Fort Worth, Tex., for a new plant, to give employment to about 100. It will be used for the manufacture of brass castings and other metal products. The company proposes to remove its present works to the new location. Plans for the initial structure have been filed.

The Palm Beach County Board of Public Instruction, West Palm Beach, Fla., has awarded contract to E. H. Barco, West Palm Beach for a new one-story vocational school. O. J. Williams, West Palm Beach, is architect.

The Shreveport Ice Co., Shreveport, La., will soon commence the construction of a new ice and refrigerating plant at Zwolle, La., to be ready for service during the spring.

Canada

TORONTO, Jan. 30.

Machine tool dealers in this section state that inquiries are coming forward in goodly number, but buying has not yet started to pick up to the extent some expected a month or two ago. Manufacturers of equipment now report more activity and several firms are fairly well supplied with orders. The Canadian Fairbanks-Morse Co., Montreal, states that the business closed in its small tool and machine shop supply departments has increased to a marked extent the past two weeks, the rural population purchasing very freely of late gas engines, pumps and many specialties for farm use. While the demand has improved from smaller buyers, large lists are absent from the market. Prospective buyers, however, are making their requirements known, and it is generally expected that the demand for most lines of equipment will be active by next spring. Small tools are moving well. During the week, high speed drills dropped 10 per cent in price, and it is expected that this decline will further stimulate business in the small tool market.

The Vulcan Co., 84 Fulton Street, London, Ont., maker of iron castings and equipment, is in the market for metal-working machinery, lathes, planers, shapers, welding equipment, riveters, and belting.

The Board of Waterworks, Essex, Ont., is in the market for oil engines.

The Mis-Can-Ada Mfg. Co., 12 Chamberlain Avenue, Ottawa, Ont., recently incorporated with a capital stock of \$65,000, does not intend to build a plant at present. It has obtained suitable quarters for manufacturing vacuum cleaners, and expects to be in the market from time to time for machinery and supplies.

The Utilities Board, Simcoe, Ont., will install additional equipment in the electric light plant to increase the capacity.

The Goderich Elevator Co., London, Ont., is asking for grain handling and unloading machinery, also two steel unloading towers for elevators at Goderich, Ont.

The Sarnia Paper Box Co., Sarnia, Ont., recently increased its capital stock to \$300,000, and will move its factory to London, Ont. It is in the market for equipment to manufacture fiber and corrugated containers.

The Sarnia Collegiate Institute and Technical School, Sarnia, Ont., is nearing completion and is now ready to purchase machinery and equipment for the several departments.

The Ford Motor Car Co. of Canada, has acquired the plant of the Bain Wagon Works, Woodstock, Ont., which will be used exclusively for the manufacture of Ford trucks.

The Wettlaufer Co., Mitchell, Ont., manufacturer of concrete machinery, etc., is arranging for the erection of a one-story addition, 75 x 80 ft., of concrete and steel. It will be used as an erecting shop, and will have a traveling crane running through the center.

The town of Peterborough, Ont., is having plans prepared for a pumping station to cost \$200,000. R. H. Parsons is engineer.

J. D. McArthur & Co., Prince George, B. C., will build a sawmill there to cost \$50,000.

Alphonse Boullane, treasurer, Cap de la Madeleine, Que., will receive bids until Feb. 13, for one 6-in. automatically balanced, three-stage, centrifugal pump with dual drive consisting of electric motor and gas engine to run alternately. The engine is for service in case the electric power fails. The unit to deliver 1200 gal. per min. against 300 ft. head, operating at 1200 r.p.m., 8-in. intake, 6-in. discharge. Also one Sterling gasoline engine; one automatic electric starter; one Venturi meter, and one pressure gauge register.

The city of Toronto, proposes to spend \$10,425,000 on municipal undertakings the present year. Included in the estimates just completed by Works Commissioner R. C. Harris, is an item for additional pumps and extension of reservoirs to cost \$1,050,000.

The William Hamilton Co., Peterborough, Ont., has the contract for supplying the hydroturbines for the new power plant at Nassau, Ont., for the Canadian General Electric Co. It also has been awarded contract for the equipment for the power plant of the Red Arrow Tire Co., which has begun work on the erection of a plant at Peterborough, Ont.

James Whalen, president Port Arthur Shipbuilding Co., Port Arthur, Ont., states that his company has received contract from the Matthews Steamship Co., Toronto, for the construction of a 550-ft. lake freighter. The vessel will be built in Toronto and will give employment to about 700 men. About 400 men will be taken on at the Port Arthur plant for work on a contract for paper machinery required by the Provincial Paper Mills. The construction of the paper machines will require about two years.

The Utilities Board, Simcoe, Ont., proposes to install additional electrical equipment in its electric plant. Dr. A. T. Sihler is chairman.

The ratepayers of Trenton, Ont., passed a by-law authorizing the construction of a petroleum refinery for the Mona Petroleum Products Co., 120 Adelaide Street West, Toronto. Dr. G. Hertischka is manager.

The ratepayers of Port Arthur, Ont., passed a by-law granting concessions to the Provincial Paper Mills, Ltd., 56 University Avenue, Toronto, which will proceed with the erection of a mill to cost \$1,500,000.

Plans of New Companies

The Standard Foundry Products Co., 661 Lafayette Avenue East, Detroit, will manufacture brass, bronze and aluminum castings, rough or finished.

The Summit Stove Co., Morrison, Ill., will manufacture stoves, ranges and furnaces, continuing the business which has been conducted for some years by the Summit Stove Works.

The Western Instrument & Mfg. Co., 1061 Washington Boulevard, Chicago, recently incorporated with a capital of \$12,000, will manufacture medical, surgical, dental and veterinary instruments, and other precision equipment. It will maintain a punch press department and will specialize in light die work. The company expects to build special machinery and do manufacturing work by special contract.

The Arlon Steel Co., 141 Milk Street, Boston, has been formed to deal in high grade steel of every description.

The Signal Truck Corporation, Detroit, has been formed to continue the manufacture and sale of the Signal truck formerly made by the Signal Motor Truck Company, dissolved. The stockholders of the new corporation purchased at public auction from the receivers the assets of the Signal Motor Truck Company, including the equipment the present organization consists of.

The Walker Machine Works, will operate a foundry at Charlottesville, Va., making very large castings up to 1600 lb. The machine shop is adapted for the building of special machines of a small and intricate nature. The owner of the plant is Charles M. Walker.

The Canadian Automatic Fire Alarm Co., Kansas City, Mo., expects to shop on the open market for contracts to manufacture its various products which are outlined in a booklet now being mailed.

The use of roller bearings for railroad freight and passenger cars has been under investigation for more than a year by the Michigan Central Railroad. The bearing is the invention of L. K. Stafford, Detroit.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb
Reinforced bars, base price	2 52c.
Swedish bars, base price	10 00c.
Soft steel bars, base price	2 53c.
Hoops, base price	3 38c.
Bands, base price	3 13c.
Beams and channels, angles and tees	
3 in x 1/2 in and larger, base	2 63c.
Channels, angles and tees under 3 in x	
1/2 in, base	2 53c.

Merchant Steel

	Per Lb
Tie, 1 1/2 x 1/2 in and larger	2 50c.
(Smooth finish, 1 to 2 1/2 x 1/2 in and larger)	2 70c.
Toe calk, 1/2 x 3/8 in and larger	3 20c.
Cold-rolled strip, soft and quarter hard	6 20c to 7 25c.
Open hearth spring steel	3 55c to 6c.
Shafting and Screw Stock:	
Rounds	3 45c.
Squares, flats and hex	3 95c.
Standard cast steel, base price	12 00c.
Extra cast steel	17 00c.
Special cast steel	22 00c.

Tank Plates—Steel

3/4 in on heavier	2 63c.
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Sheets

Blue Annealed

No	Per Lb
No 10	3 28c to 3 53c
No 12	3 33c to 3 58c
No 14	3 38c to 3 63c
No 16	3 48c to 3 73c

Hot Annealed—Black

No	Soft Steel C R On Pass Per Lb	Blue Stove Pipe Sheet Per Lb
No 18 to 20	3 55c to 3 80c	
No 22 and 24	3 60c to 3 85c	4 10c
No 26	3 65c to 3 90c	4 15c
No 28	3 75c to 4 00c	4 25c
No 30	4 00c to 4 25c	.....
No 21 and lighter 36 in wide, 10c higher.		

Galvanized

No	Per Lb
No 14	3 85c to 4 10c
No 16	4 00c to 4 25c
No 18 and 20	4 15c to 4 40c
No 22 and 24	4 30c to 4 55c
No 26	4 45c to 4 70c
No 27	4 60c to 4 85c
No 28	4 75c to 5 00c
No 30	5 25c to 5 50c
No 28 and lighter, 36 in wide, 20c higher.	

Welded Pipe

Standard Steel

	Black Galv	Wrought Iron
1/2 in. Butt	—56 —40	1/2-in Butt... —30 —13
3/4 in. Butt	—61 —47	1 1/2-in Butt... —32 —15
1-in Butt	—63 —49	2-in Lap.... —27 —10
1 1/2 in Butt	—60 —46	2 1/2-in Lap.. —30 —15
2 in Lap	—56 —34	7-12-in Lap.. —23 —7
3-12 in Lap	—57 —33	

Steel Wire

BASED PRICE* ON NO 8 GAGE AND COARSER

	Per Lb
Black basic	3 50c to 3 75c
Annealed soft	3 50c to 3 75c
Galvanized annealed	4 25c to 4 50c
Coppered basic	4 00c to 4 25c
Tinned soft Bessemer	5 50c to 5 75c

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 1/2 c. to 17 1/2 c.
High brass wire	17 1/2 c. to 17 1/2 c.
Brass rod	14 1/2 c. to 15 c.
Brass tube, brazed	26 c. to 27 1/2 c.
Brass tube, seamless	18 1/2 c. to 19 c.
Copper tube, seamless	21 1/2 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21 1/2 c. per lb. base.
Cold rolled, 14 oz and heavier, 2c. per lb advance over hot rolled

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Primes	Wasters
	AAA	A			
	Charcoal	Charcoal			
	14x20	14x20			
IC. \$10 00		\$8 50	80 lb....	\$6 05	\$5 80
IX.. 11 25		10 00	90 lb....	6 15	5 90
IXA.. 13 00		11 50	100 lb....	6 25	6 00
IXAA.. 14 75		13 25	IC...	6 40	6 15
IXAAX.. 16 25		15 00	IX...	7 40	7 15
			IXX...	8 40	8 15
			IXXX...	9 40	9 15
			IXXXX...	10 40	10 15

Iron Plates

8 lb Coating 14 x 20

100 lb	\$7 00
IC	7 25
IX	7 50
Pure door stock	10 00

Tin

Strait's pig	35c.
Bar	40c to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15 1/2 c.
Casting	15 1/4 c.

Spelter and Sheet Zinc

Western spelter	6 1/2 c. to 7c.
Sheet zinc, No 9 base, casks	10 1/2 c. open 11c.

Lead and Solder*

American pig lead	5 1/2 c. to 6 1/4 c.
Bar lead	6 1/2 c. to 7 c.
Solder, 1/2 and 1/2 guaranteed	27c.
No 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6 1/4 c. to 6 1/2 c.
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Aluminum

No 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....26c. to 28c.

Old Metals

The market continues very sluggish and business is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.50
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.75
Heavy machine composition	3.00
No 1 yellow brass turnings	5.50
No 1 red brass or composition turnings	7.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, February 9, 1922

ESTABLISHED 1855

Molding Machine Practice Is Successful

Even Without Castings Recurring in Large Numbers, the Method May Be Made to Pay—Details of Equipment and Its Use

BY PAUL R. RAMP*

IT is not the intention of the writer to describe anything new or startling in molding machine practice, nor to offer the best methods for machine molding. This is rather the description of a plan whereby an emergency can be met that will net the company profits, regardless of the fact that the number

means are not devised, as is nearly always possible, to make the molding machine a success on small lot production.

The molding machine, intelligently handled, is with very few exceptions a paying investment in any jobbing foundry producing as much as 8 or 10 tons per day. True, there are many cases where this has not been proved to the satisfaction of all concerned. But a careful investigation will often reveal the facts that the method of handling the work, and a desire to hinder progress along this line, were responsible for the failure, rather than a poor field for the work.

Any foundryman can successfully introduce a molding machine, and get results, if the pattern equipment and flask equipment are in first class condition. All that then remains to be done is to start some man to operate it. In cases of this kind there are always large quantities to make from one pattern, and the operator will teach himself in a short time.

The proposition we have in mind requires work and study on the part of the foundryman. Realizing this, he is often tempted to frighten his employers out of

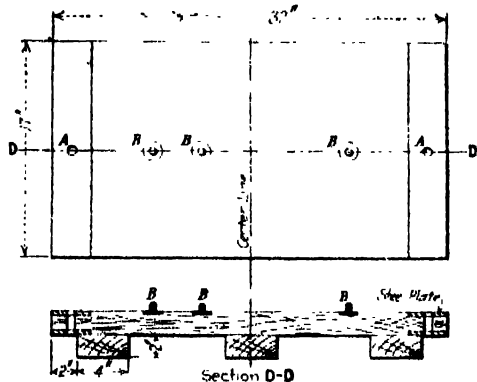


Fig. 1. Pattern Board for Molding Machine Use

of pieces to be molded is small, the patterns in poor condition and badly worn, while one pattern is used for several different parts, by minor changes, etc.

It is generally conceded that, unless there is a large number of one piece to make, the expense of fitting the patterns to molding machines will not pay. And to secure the best results from the use of molding machines, the patterns and equipment must be as nearly perfect as it is possible to make them. It is also the universal opinion of foundrymen that a foundry which is producing only a few parts from each pattern daily, on what might be termed a jobbing basis, can never be developed into a "production" shop.

In a large measure this is a mistake. While it may be true that the jobbing foundry cannot hope to get the same results as a well equipped production shop, there is no reason why the jobbing shop cannot work along the same lines, and secure a production equal to 60 per cent of that of the production foundry, rather than 25 per cent, as is usual.

We are too easily convinced that it will not pay to machine mold our castings, because the quantity ordered is small or the patterns are bad. This is our excuse for not installing machines, and while this saves the foundry executives a great deal of worry and work, the company must stand the loss, because ways and

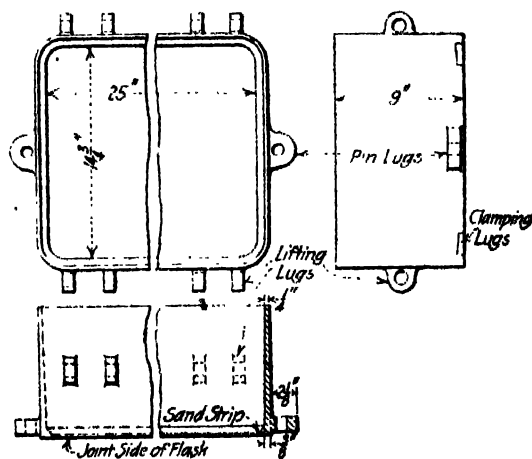


Fig. 2. Standard 16 x 24-In Molding Flask for a Jolt Roll-Over Molding Machine

the inclination to purchase molding machines, by showing them the lack of possibilities in their shop. By comparing their work with the work that is being done in the production shop on machines, he is able to put up a very convincing argument.

Consider the company manufacturing a large number of different sizes and classes of machines, where

*Seattle, Wash., Station.

the orders come in small lots, often only one machine of a kind. This makes it necessary to have many different jobs moving through the shop at one time. The question of making a quantity of these different pieces and carrying them in stock cannot be considered, because the investment would be too great. And the plant is not large enough to keep up with the regular diversified demands, and at the same time to build stock machines.

To keep pace with the machine shop, the foundry must produce a few pieces from each pattern daily, and often only one. This cuts down the foundry production on each pattern to a few per day. Some of the so-called natural-born foundrymen will at once decide that the only way to handle this work is hand molding. The owner will proceed to fill his shop with men who have

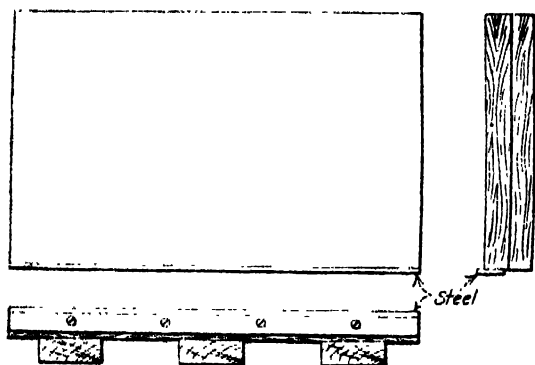


Fig. 3. Roll-Back Board

made this class of work for the last thirty years, and they will make it just as they did thirty years ago.

To meet this emergency with the molding machine, arrangements must be made to change patterns on the machines with the least possible delay. To do this several things must be considered: the size of flask to be used—the size of machine to assign to this size of flask—the number of patterns that will fit into these flasks; and last, a plan that will make it possible to switch from one pattern to another quickly, and to use poor patterns, some of which may belong in the scrap heap.

The plan we have to offer is to classify the work, not as to its character, but rather as to the size of the pieces that can be molded in a standard size flask. Each machine must be provided with the required number of flasks, all of those for one machine to be the same size and style.

For instance, a jolt roll machine will be assigned a flask that measures 16 x 24 in. inside, and all pieces that can be molded in these flasks will be produced on the machine where these flasks are used. A larger plain jolt machine may be provided with a set of flasks 42 x 48 in., enough in number to take care of a day's work.

The production on each machine will be measured by the number of flasks or molds produced. The machines using the 16 x 24 in. flasks should easily turn out 80 molds per day, of general jobbing work, with one operator, one finisher and one helper. This will be an increase of 100 per cent over hand molding, and in many cases more. The plain jolts can be worked in the same manner, and will show an equal increase in production.

In making the standard flasks for all machines, the bars for the copes must not be cast in, but, in the larger flasks, provisions should be made for putting in the bars quickly when needed, without the use of bolts. It has been proved that greater progress can be made on a large percentage of the work, with no bars in the cope or drag.

Only one standard board should be provided for each

machine, this pattern board to take care of all cope and drag patterns used throughout the day. Figure 1 is a standard pattern board for a jolt roll-over molding machine. Our plan does not include the drawing of the pattern by the machine. When this board is used, the machine rams the mold, and then rolls it over and deposits it on the receiving device.

This pattern board is a good substantial board, with both ends bound with steel plates for the pin holes, and to prevent excessive wear by the flasks. The board is provided with three dowel pins, marked *BBB*, which are used to locate each pattern. Corresponding pin hole plates are located in all patterns used on the machine. Providing the patterns with these dowel plates is all that is required to fit them for a molding machine job, and thus insure a decided increase in production.

A standard pattern board, that permits the use of many different patterns, is the foundation of the method here described. This makes it possible to use a large number of different patterns daily, regardless of their shape or condition. The only requisite is that they are within the limits of the standard flask used.

Greater economy could be effected by the use of patterns that are in good condition, but we are dealing with circumstances that prohibit pattern expense. And rather than resort to hand molding methods, in vogue 50 years ago, a saving is made in the cost of molding, which could not otherwise be accomplished. Putting dowel plates in one old steam cylinder pattern may amount to one hour's work. To fit the same job to a board, so that it could be drawn by the machine, would require several days, and probably a new pattern.

Figure 2 is the standard 16 x 24 in. flask for a jolt-roll molding machine. This flask is made as light as

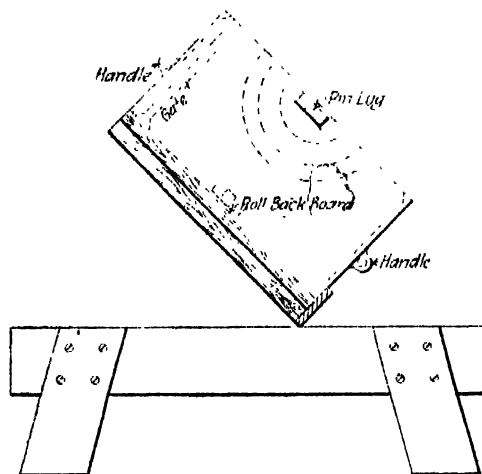


Fig. 4. Rolling Rammed Cope on Roll-Back Board Preparatory to Drawing Pattern, or to Closing the Mold after the Pattern Is Drawn

possible, as it must be carried to the floor by two men. It would slow up production to handle this flask with a crane or air hoist. Steel flasks made after this design are lighter and stronger than those of cast iron.

Note the sand strip on the joint edge on the flask, also the slight taper that helps to hold the sand in. No bars are used, which avoids swells in the castings, caused by soft places under the bars. More speed is possible without the bars, and less breakage, as the molds are shaken out very easily on account of the taper.

As handles, when cast on the flask, occupy too much space, and are often broken off, lugs on the sides are used in connection with removable lifting handles. These flasks are not rapped when the molds are shaken out, but the cope is rolled off first, making it possible to lift the flask free from the sand without any rapping.

ping. The drag is shaken out next, as it is in a position to release the sand very readily.

We have used a set of these flasks for eight months without one breakage, simply because this rule for shaking out was observed at all times. The round corner increases the life of a cast iron flask at least 50 per cent. The dove-tail lugs on the four corners are used to clamp the cope and drag together, when the weight used on the cope is not sufficient to hold it down for pouring.

When flasks without bars are used, the roll-back board is necessary, to prevent the molds from falling out backwards. But in cases where very large flasks without bars are used, that must be handled with a

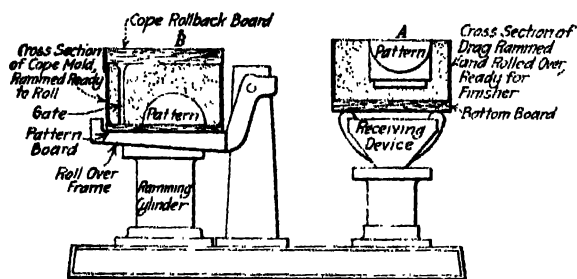


Fig. 5. Jolt Roll-Over Molding Machine Producing Work from Loose Patterns

crane, a plate is clamped over the top of the cope to hold the sand in, when the mold is rolled over. The roll-back board, Figure 3, consists of a smooth board, the same size as the standard pattern board, but without pin holes. A strip of flat steel, secured to one edge of the board, extends $\frac{1}{2}$ in. above the surface, to prevent the mold from slipping when it is rolled over.

On small flasks that must be handled by hand, too much time would be consumed in clamping on cope plates, and the plates would add to the weight that must be carried by two men. For this reason the roll-back board is an important item in connection with the production of castings in the barless flask.

To use the roll-back board, after the cope part of the mold has been rammed with the machine, the sand extending above the upper limits of the flask is struck off level with a straight edge. The gate and riser pins are then withdrawn, and a smooth funnel prepared for the down gate. A portion of loose sand is distributed over the surface, and the roll-back board is rubbed down to insure an even bearing between it and the top of the cope mold.

The mold is then clamped and rolled over, and deposited on the receiving device, when it is ready to be carried to the floor by the finisher and his helper, or two helpers, as the case may be. The cope molds remain on the roll-back board, while they are carried to the floor, where they are placed on horses located conveniently near the drag molds. At this time the finisher draws the patterns, and prepares the mold for closing.

Figure 4 shows a finished mold being rolled back after the patterns have been drawn and the mold finished. When the mold has reached a position that brings the flask at right angles with the horses, the board will be allowed to drop back, as the mold in this position will not fall out. As soon as the roll-back board has thus been removed, the loose sand is blown out of the gates and risers. The cope is now ready to place on the drag.

When the finisher goes to the machine after the next drag mold, he returns the roll-back board to the machine operator. But each operator is provided with two or more such boards, to prevent delay, should the finisher be prevented from releasing it promptly, due to trouble with a sand. And in using old worn-out pat-

terns, as is the case described here, very often the finisher is slowed up, and then must speed up when he receives the more simple pieces.

In reading the description of the use of the roll-back board the question comes to the reader's mind: "If the mold will fall out backward so easily, what is to prevent the molds from 'coping' when they are poured?" Weights must be used on the barless flasks used in this plan, the weights in many cases taking the place of clamps.

Figure 5 represents a jolt roll-over machine in operation producing work from loose patterns, at the rate of one or two from each, without the usual delay in changing pattern equipment. A indicates the drag part of the mold, that has been rammed, rolled over and deposited on the receiving device, ready for the finisher and his helper to carry to the proper place on the floor. There the pattern will be drawn by hand and the cores placed. B is the cope part of the mold, which is rammed, the roll-back board put in place, clamped and ready to roll over as soon as the drag mold is removed from the receiving device.

As the helper brings the drag patterns back to the machine operator, when he comes after the cope mold, this avoids any delay to the operator.

As soon as the jolt side of the machine is relieved of the cope mold, the operator blows off his pattern board, places the drag part of the next pattern on the standard pattern board, and proceeds to make another drag mold. In the meantime the finisher has prepared his drag, and takes the cope mold from the receiving device in time to allow the operator to roll over his new drag and deposit it on the receiving device.

These operations are continued all through the day, and good team work will secure a production that is often equal to the quantity of work made on a machine-drawn pattern. The finisher or his helper returns the cope patterns to the operator when he comes after the next drag mold, as well as any set of gates that may be in use. In cases where the operator changes his pattern, the helper places on the shelf the patterns used to make the previous mold, instead of delivering them to the operator.

(To be concluded)

Pump Standards Recommended

To encourage suitable standards of manufacture and engineering practice, to assist in the development of standard methods of manufacturing procedure and to develop co-operation with the customers of the pump industry, what is known as the Hydraulic Society has published a booklet, "Trade Standards in the Pump Industry." This explains trade definitions, customs of and terms used in the industry with listings of standard and extra equipment.

The society believes that the booklet will eventually be looked upon as giving standards similar to the standards established by the American Society of Mechanical Engineers. Copies of the publication may be obtained from the secretary of the society, C. H. Rohrbach, 50 Church Street, New York. F. J. Emeny, Deming Co., Salem, Ohio, is president of the society; E. B. Neal, Kinney Mfg. Co., Boston, vice-president; R. R. Hicks, American Steam Pump Co., Battle Creek, Mich., treasurer, and L. D. Albin, A. S. Cameron Steam Pump Works, New York, is chairman of the plan and scope committee.

At the annual meeting of the Falcon Bronze Co., Youngstown, Ohio, directors and officers were re-elected. The company's business is largely confined to the iron and steel industry. Production is now at the rate of 50 per cent, as compared with an average of 30 per cent throughout 1921. G. A. Doeright is president of the company; John Noll, vice-president; James L. Wick, secretary, and E. E. Miller, treasurer.

Papers for American Foundrymen's Convention

The papers committee of the American Foundrymen's Association reports that an interesting program is being arranged for the coming convention at Rochester, N. Y., June 5 to 9. Special sessions are planned for the various branches of the industry, besides an industrial relations session and a session which will be devoted to papers and committee reports on the subject of molding sand research. Some 40 papers have been promised, of which number the following have been received by the secretary of the papers committee:

"Rate of Formation and Geometric Form of Graphite and Temper Carbon," by E. J. P. Fisher, Atlas Die Casting Co., Worcester, Mass.

"Getting Up Flask Equipment for Production Work," by Arnold Lenz, Saginaw Products Co., Saginaw, Mich.

"Technical Control of the McCook Field Foundry," by E. H. Day, Jr., McCook Field, Dayton, Ohio.

"Annealing and Aluminum Alloy Melting Furnaces," by R. J. Anderson, Bureau of Mines Station, Pittsburgh.

"Commercial Electric Steel Castings vs. Malleable Castings," by J. W. McKeon, West Michigan Steel Foundry, Muskegon, Mich.

"Design of Gated Ladles," by A. W. Gregg, Whiting Corporation, Harvey, Ill.

"The Behavior of Fire Brick in Malleable Iron Furnace Bungs," by H. C. Schurecht, Ceramic Experiment Station, U. S. Bureau of Mines, Columbus, Ohio.

"Electric Crane in Foundry Service," by A. H. McDougall, Whiting Corporation, Harvey, Ill.

Program for Boiler Makers' Meeting

An outline of the program of the meeting which the American Boiler Manufacturers Association will hold on Feb. 13 at Fort Pitt Hotel, Pittsburgh, has been announced by H. N. Covell, secretary-treasurer of the association, 191 Dikeman Street, Brooklyn. In brief it is as follows:

Walter Gordon Merritt, of the League for Industrial Rights, on "American Labor Policies."

Ralph M. Easley, chairman executive council National Civic Federation, on the purposes and accomplishments of that organization.

C. V. Kellogg will open a discussion on taxation.

W. A. Drake will open a discussion on "Limitation of the Field for the Use of Cast Iron Boilers."

E. R. Fish, chairman sub-committee of the boiler code committee of the American Society of Mechanical Engineers, will speak on "Welding as Applied to Boilers and Other Pressure Vessels."

Charles E. Gorton, chairman American Uniform Boiler Law Society, will give an account of the operations of that organization to date and will be prepared to answer questions in connection with the National Board of Boiler and Pressure Vessels Inspectors, particularly as applied to stamping and filling in the data sheets for boilers.

Answers to the recent questionnaire on wages have been received in sufficient number to warrant a tabulation.

British Institute of Metals

The annual meeting of the Institute of Metals will be held in London, England, March 8 and 9, when 10 important papers are to be presented for discussion. The annual dinner will be held at the Trocadero restaurant on Wednesday, March 8.

The annual May lecture will be delivered on May 3 by Sir Ernest Rutherford, B. R. S. on "The Relation of the Elements." The discourse should throw fresh light on the much debated subject of the possible transformation of one metal into another. The autumn meeting will be held—for the first time—at Swansea, Wales, Sept. 20 to 22. A large gathering is expected in this important metallurgical center.

In view of the attractive nature of the program for the ensuing year it is expected that the growth of the institute in 1922 will be even greater than it was last year, when the membership increased from 1298 to 1410—a record year's growth. Such an in-

crease, occurring during a year of great trade depression, indicates that makers and users of non-ferrous metals and alloys are now more than ever on the alert to take advantage of the scientific information obtainable through association with the institute that exists to foster their interests.

The Institute of Metals has just issued a practical pamphlet of 32 pages given in summary form the results of over 10 year's research into the causes and prevention of corrosion in condenser tubes. The pamphlet, which is one that will appeal particularly to all engineers, can be obtained, price 2s. 8d. post free, from the Institute of Metals, 14 Members' Mansions, London, S. W. 1.

Steel Club Dinner

The Steel Club of Philadelphia held its mid-winter dinner at the Bellevue-Stratford Hotel Friday evening, Feb. 3. H. E. Resch, of the Whitehead & Hoag Co., Newark, N. J., delivered an address on "Shakespeare As a Salesman." Aldrich W. Stein, a hand writing expert, delivered a stereopticon lecture on "Forgeries and How the Hand Writing Expert Discovers Them." Several solos were sung by L. V. Geist of the Donner Steel Co.'s Philadelphia office.

National Metal Trades Convention

The program of the annual convention of the National Metal Trades Association to be held at Hotel Astor, New York, April 17 to April 20, inclusive, provides for the executive committee meeting, a meeting of local branch secretaries and a dinner of local branch secretaries will come on Monday; the administrative council meeting, a meeting of local branch secretaries, and the so-called alumni dinner on Tuesday, leaving for Wednesday and Thursday the convention proper. A buffet luncheon will be held as usual on Wednesday, with the banquet in the evening.

New England Foundrymen's Association

Edwin S. Carman, secretary and chief engineer of the Osborn Mfg. Co., Cleveland, gave an illustrated talk on "The Application of Molding Machines to Miscellaneous Castings Production" before the New England Foundrymen's Association, on Wednesday evening, Feb. 8, at the Exchange Club, Boston. While Mr. Carman discussed the application of the molding machines to miscellaneous production, he also showed the advantages gained by the use of the same machine in quantity production. At a dinner preceding the talk, E. H. Ballard, newly elected president of the association, presided.

February Meetings of Association of Iron and Steel Electrical Engineers

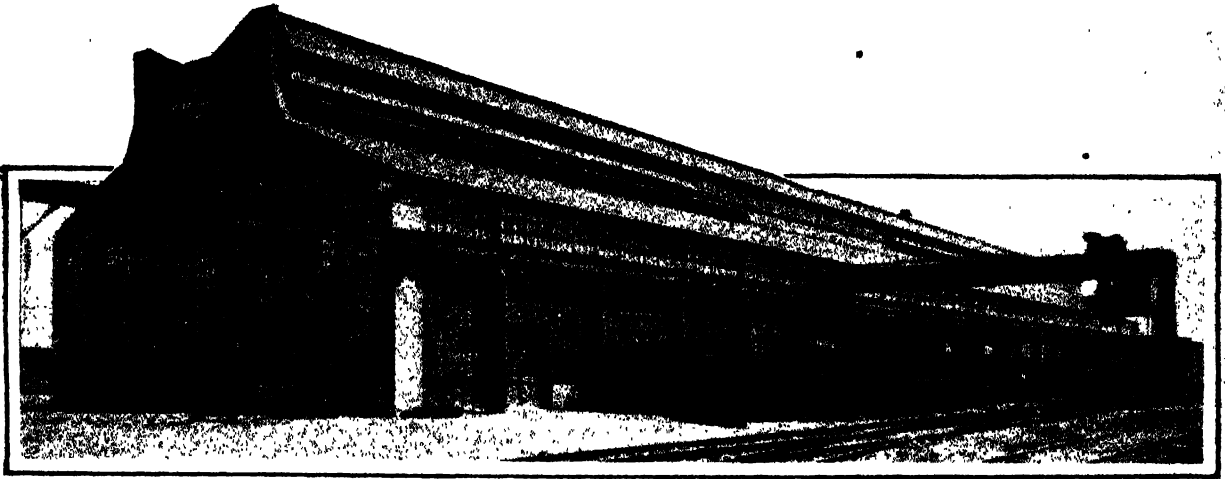
At Cleveland, Feb. 13, a paper will be read on "Gaseous Fuels and Their Use in Iron and Steel Plants."

At Pittsburgh, Feb. 18 there will be a paper on "Departmental Organization and Education."

At Birmingham, Feb. 25, the subject of "Operation of Frequency Changers" will be discussed.

Standardization Making Progress

WASHINGTON, Feb. 7.—Subcommittees of the National Screw Thread Commission have begun consideration of questions relating to the standardization of bolt heads, nuts, wrench and drill and tap sizes and hope to report at the next meeting of the commission about March 1. Provision for extending for five years the term of the commission was made in a bill which recently passed the House, and Senator LaFollette having concluded to report favorably on it, there will be no hearings before a Senate committee.



Plant Makes Upset Forgings Exclusively

New Shop of Amforge Co. Is Unique Because of Its
Equipment, Layout and Methods of Stores
Keeping-- Ventilation a Feature

RECENTLY completed at Chicago, the plant of the Amforge Co. is unique in that it is the only forge plant in the world devoted exclusively to the manufacture of upset forgings. This process of forging is practically in its infancy. Less than ten years ago, forging machines were principally used for flanging crankshafts and for preparing stock preliminary to work under hammers. During the last few years, however, the new method of forging has developed rapidly until it is estimated that 250 upset forging machines are now operating on commercial forgings, finished complete and ready for machining.

In conjunction with the use of upsetting machines, the Amforge Co. has introduced improved methods of die making and steel gathering, which enable it to produce transmission gear parts requiring the utmost strength, which, it is asserted, show far better physical properties than hammer forgings. The company's practice calls for round bar steel of forging quality, closely inspected for seamy stock. The bar is always forged horizontally, and forced into the dies by the headers in two or three operations. In the drawing is shown a stem pinion after the first and last operations. It will be noted that the grain of the steel in the finished pinion is such that teeth will be cut against it.

Drop hammer gears, on the other hand, are made from flats, billets and rounds--whichever is best adapted for the piece and often little attention is given to controlling the grain of the steel, so that on some gears the teeth at one point are against the grain, while at another point they are with the grain. It is also claimed, as an advantage for the upsetting

method, that it does not tend to crystallize the steel, while drop forging often does produce that effect.

While the equipment of the Amforge plant includes two large Chambersburg steam hammers of 2000 lb.

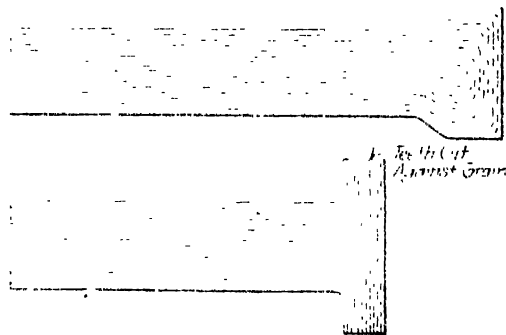
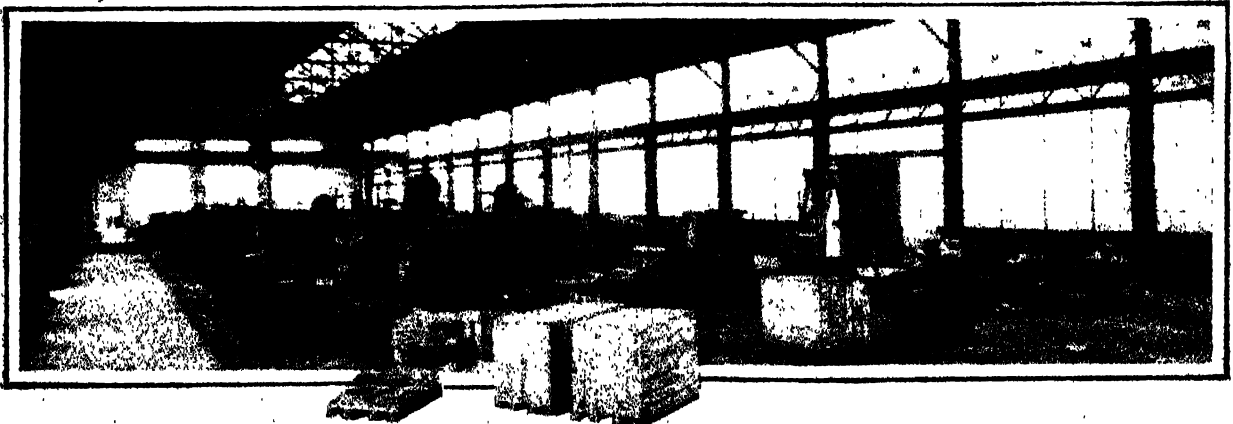


Diagram Showing How the Straight Grain of the Steel Bar Is So Changed in the Upsetting Process That Teeth May Be Cut Against It

and 3000 lb., respectively, these are utilized in connection with the manufacture of dies. All finished forgings are made in the upsetting machines, each driven by an individual motor. The arrangement of



Interior of Main Shop Before Heavy Upsetting Machines Were All Installed

the main shop in relation to incoming and outgoing materials, the character of the material handling equipment, the methods employed to keep track of stock throughout all stages of manufacture, the manner of storing and disposing of scrap—all bear the earmarks of a thorough survey of the many-sided problems encountered in working out a plan for maximum economy in production.

The main forge shop, 80 x 420 ft., is served by a Niles 14-ton overhead traveling electric crane, operated from the floor. This crane is used chiefly for assembling and dismantling the heavy equipment. For handling material to and from the machines, storage battery elevating trucks are used, with a capacity of 4000 lb. each. These trucks, furnished by the Elwell Parker Electric Co., Cleveland, operate over concrete aisles provided throughout the shop.

The forge shop is divided into two units, one containing the larger and the other the smaller machines. Between the two departments, a 20-ft. concrete aisle leads directly to the shipping, inspection and heat treating rooms. Sixteen upsetting machines, staggered throughout the length of the shop, alternately face opposite sides of the building. Fifteen were built by the Ajax Mfg. Co., Cleveland, and the other by the National Machinery Co., Tiffin, Ohio; there are four 3-in., six 5-in. and six 7-in. machines. Each forging

is included in sales invoices to customers. Material bought for the repair or renewal of the physical property of the plant is classified as "repair merchandise," the symbol of which is "Rem." All material which passes through the stores department and which is eventually used through requisitions, but cannot be classified under sales or repair merchandise, is put into the "supply merchandise" account, the symbol for which is "Sum."

Corresponding to each store yard ticket is a storekeeper's record card, on which are registered not only the lot number, the steel analysis and the symbol of the account to which the material is charged, but also the name of the company from which the material was bought, the weight of the bundle, the number of bars it contains, and their size and length. Each bundle of steel retains its lot number until all of it has been disposed of. Requisitions against a bundle are recorded on the stores card, so that at all times the storekeeper has an accurate check on unused material in stock.

Careful record is kept of the weight of material used for specific orders. When the manufacturing department receives an order for a certain lot of forgings, and is ready to make out a material requisition on the stores department, it first figures out the cutting length of the stock required to make the finished forg-



Elevating Trucks Bring Forging Boxes Containing Finished Product into Inspection, Grinding and Shipping Room

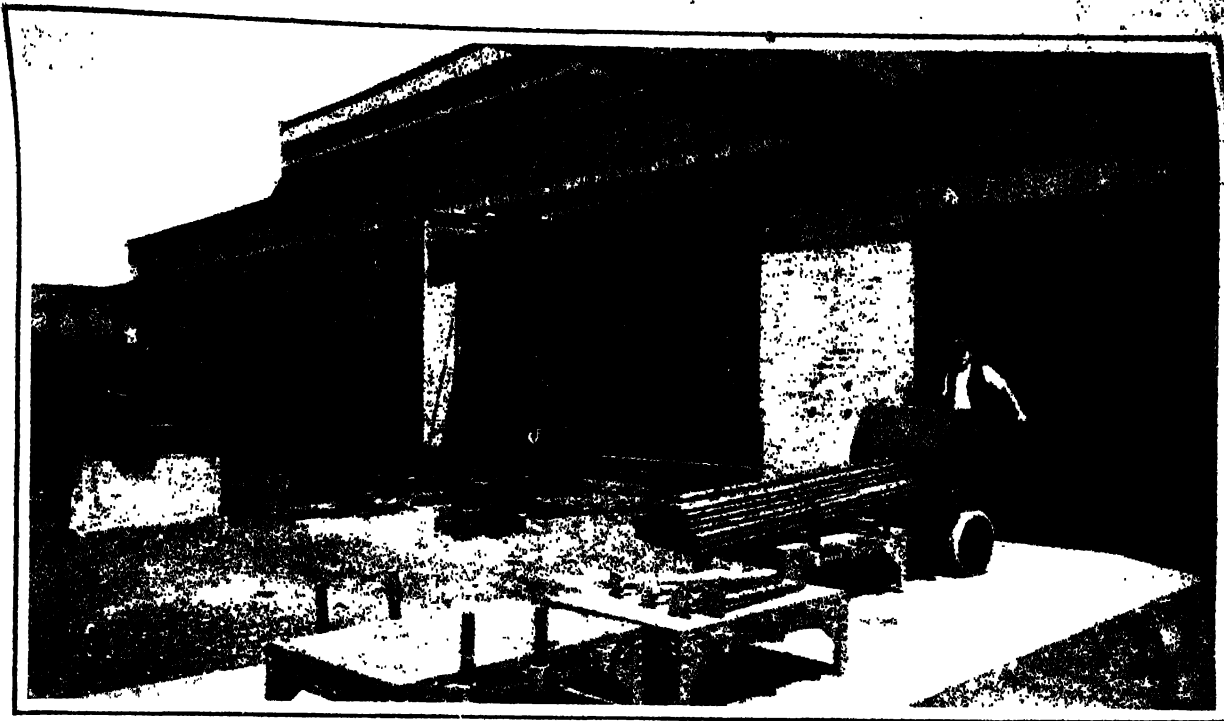
machine is served by hot saw and burring machines for cutting off and smoothing forgings, and with oil forgings for heating the bar stock to working temperature. A General Electric motor driven 75-hp. blower, delivering 6200 cu. ft. of free air per min. at 2 lb. per sq. in. pressure, furnishes the necessary air for fuel oil combustion.

The receiving side of the building is served by a siding from the Chicago, Burlington & Quincy Railroad. Between the siding and the plant is a stock yard commanded by a 10-ton Milwaukee Electric Crane & Mfg. Co. crane, of semi-gantry type. One end of the crane is supported by a leg which runs on a rail laid on the ground, while the other end runs on an overhead runway attached to the side of the building.

To every bundle of incoming forging steel is attached a lot-number ticket, on which is recorded the asset account to which the material is charged, the lot number and the analysis of the steel. For example, a card carrying the designation "Sam Lot No. 54, 55/70 carbon" would indicate that the carbon ranged from 0.55 to 0.70 per cent, and that the material was charged to the Sales Merchandise account. The classification "sales merchandise" includes all material purchased for production uses, which eventually

ing, and then computes the standard bar length to use to obtain these cutting lengths with the least waste, the number of bars required from the stock yard to fill the order, and the theoretical weight thereof. All of this information is recorded on the requisition and, in addition, the purpose for which the material is to be used is specifically stated. Upon receiving the requisition, the storekeeper picks up from the yard the number of bars of the specified size, and weighs them on a Standard Scale & Supply Co. rolling mill scale, whereupon he enters the actual weight on the requisition, adjacent to the theoretical weight previously recorded. The weighing of material before it enters the manufacturing department, as well as before shipment in finished form, is rather unusual, but is an aid to accurate cost keeping.

Skid rails extend from the storage yard into the stock cutting room, which is a lean-to to the main forge shop. Here are located a No. 4 guillotine shear, made by the Hilles & Jones Co., Wilmington, Del., and a Higley cold saw furnished by the Vandyck Churchill Co., New York. The shear has a capacity for 4-in. rounds, and for angles up to 6-in. x 6-in. x 1/4-in. The Higley cold saw is used to cut steel used for headers, which may run as high as 0.80 or 0.90 per cent carbon, and cannot be handled on the guillotine shear.



Crane Sliding Stock Across Skid Rails into Shear Room. Elevating trucks move material stand and all as shown

Steel is handled direct from stores to the shear room without reloading. No narrow gage or industrial tracks are used. After the material is weighed and placed on the skid rails, it leaves the hands of the storekeeper and passes under the authority of the manufacturing department.

Shipping, inspection and heat-treating departments are located in a building adjacent to the main forge shop, but separated from it by a 10-ft. areaway, so that air for ventilating purposes is provided on that side. In the heat-treating department are four double-end Tate-Jones & Co. annealing furnaces, served by two water quenching tanks, one at each end of the furnaces. The furnaces are of the car-type, and forgings are handled to and from the cars, and into and out of the quenching tanks, by a Yale & Towne one-ton electric hoist. The furnaces are equipped with a temperature recorder furnished by the Wilson-Maulen Co., New York.

In the adjacent grinding and shipping room are two W. W. Sly Mfg. Co. tumbling barrels, used to remove scale from carbon steel forgings. Flashings and all rough edges are taken off on grinding machines, there

being six double grinders, operated from a line shaft. For drilling automobile hub forgings and other similar work, three "Hole Hog" drills, furnished by the Moline Tool Co., Moline, Ill., are used. Other equipment includes a Toledo trimming press, and a cutting-off machine furnished by the Modern Machine Tool Co., Jackson, Mich. A 10,000-lb. Toledo springless scale weighs all material leaving the shipping department.

The forging boxes, in which finished material is brought into the shipping room by the elevating trucks, have bottoms constructed of open pipes. This permits dust and dirt to fall through to the floor, while the passage of air through the pipes serves to cool the forgings. The tare weight of the trucks is checked every morning and the box weights are also checked periodically; thus the shipping weight is obtained by subtracting the weight of the truck and box from the total weight. The shipping platform, of concrete, is served by a railroad siding. A loader manufactured by the Barber-Greene Co., Aurora, Ill., is used to transfer heavy forgings from the shipping platform to cars.

Adjoining one end of the main forge shop is the



Upsetting Machines and Oil Furnaces Alternate at Right. In center are a hot saw and a hurring machine, with smaller equipment in foreground

machine repair shop and die storage. The machine shop, used largely for maintenance work and for machining dies and headers, contains some large equipment, including a Niles-Bement elevating table horizontal boring mill, a 60-in. Bement drill press, a Cincinnati Planer Co. widened pattern 48-in. x 60-in. x 14-ft. planer with four heads and self-contained motor drive, a Niles-Bement-Pond 42-in. x 42-in. x 10-ft. planer with two heads and self-contained motor drive, a Fifield-Wright 60-in. x 15-ft. triple-gear drive into face plate engine lathe, a 26 in. x 15 ft. Walcott engine lathe, a 26-in. x 24-ft. Walcott engine lathe, and a 25 in. x 10 ft. LeBlond heavy duty engine lathe, besides other miscellaneous machines. The shop is served by a Whiting 10-ton overhead hand-power crane.

All dies and headers are stored in the die department, arranged in numbered compartments by jobs, corresponding numbers being recorded in the storekeeper's records. The storing of the dies and headers not only enables the company to take care of repeat orders, but permits it to serve its entire trade more expeditiously and economically. When new orders are received, suitable dies and headers may often be found in stock, thereby obviating the necessity of having new ones made. The die storage is commanded by a 3-ton Whiting overhead hand-power crane.

An excellent system for taking care of scrap has been installed. Throughout the forge shop, the machine shop and the trimming room scrap buckets are placed to catch waste stock. The buckets, which were designed by the company, are lifted and carried to the steel storage yard by elevating truck. Here four chains joined together at one end in a permanent loop are fastened to four holes in the top of the bucket. For this purpose the last link in the free end of each chain is a U-link, through which a cotter pin is inserted after the chains are fastened to the bucket, by a hook from the overhead yard crane, inserted into the lifting loop, the bucket is conveyed to a scrap yard located adjacent to the railroad siding. Here the dif-

ferent kinds of scrap are dropped into separate bins, from which they may be loaded into cars for shipment.

Electricity is used for power throughout the plant, except for the steam hammers. Steam for the hammers and in cold weather for heating the oil storage tanks and the trenches carrying the oil pipes, is furnished by a coal-fired 200-hp. horizontal tubular boiler, built by the Brownell Co., Dayton, Ohio.

Fuel oil for the furnaces is supplied from three concrete storage tanks set in the ground between the steam hammer room and the heat-treating department. Tank cars, spotted on a track adjacent, are connected to an intake pipe through which the oil passes to the tanks. Three control valves permit passing the oil into any tank desired. Calibrated standpipe gages indicate the oil level in each tank.

The ventilating system used in the forge shop is unique. Instead of bricking up from the ground level to the window sash elevation, this space has been fitted with swinging doors. Thus all heat, smoke and heavy gases on the floor level, which often remain inert under other ventilating systems, are carried up to the roof and drawn out of a V-shaped monitor. Regulation of the monitor windows is handled in accordance with the direction of the wind. By opening windows on the "lee" side of the building, advantage is taken of the partial vacuum formed on that side, thereby insuring a draft which will exhaust the air rising from the floor of the shop.

Construction of the ground level doors is such as to insure the least possible interference with the circulating system. The doors are pivoted half way between the bottom and top and are swung with the top out. Hence any piles of material, adjacent to the doors outside the building, will not obstruct the inflow of air. It will be noted that the angle of the door, when opened, is upward in relation to the exterior of the building, and air can enter from higher elevations through the openings provided, both above and below the axis of the door.

FEWER IRON AND STEEL WORKERS

Gain in Employment Halted -General Industry Busier

WASHINGTON, Feb. 7.—The increase in employment in the iron and steel industry which set in last August gave away for the first time since then in January, when there was a decrease of 7130 workers, or 0.21 per cent under December, according to the January bulletin of the Employment Service of the Department of Labor. Employment by the 1428 firms reporting to the Service, however, showed an increase of 63,400 employees, or 4.2 per cent, over Dec. 31. Besides iron and steel, other industries showing decreases were textiles and their products, 949; railroad repair shops, 2387; tobacco manufactures, 803; stone, clay and glass products, 149, and lumber and its manufacture, 74. The total decrease in the six industries was 11,492. Increases in the remaining eight industries reporting were as follows: Vehicles for land transportation, 63,204; leather and its finished products, 2089; metals and metal products, 2254; paper and printing, 132; food and kindred products, 2319; miscellaneous, 4286; liquors and beverages, 10, and chemicals and allied products, 698, a total of 74,892. The firms reporting employed 1,493,107 workers on Dec. 31, as against 1,556,507 on Jan. 31.

Of the 65 cities from which reports were received, 40 showed employment increases in January. Detroit led with an increase of 89 per cent. Among iron and steel centers showing gains were Cleveland, 7 per cent; Chicago, 4 per cent; Toledo, Ohio, 3.7 per cent; Pittsburgh, 0.5 per cent and Youngstown, Ohio, 0.5 per cent. Among iron and steel centers of the 25 cities showing decreases were the following: Johnstown, Pa., 14.1 per cent; Philadelphia, 8 per cent; Buffalo, 6.7 per cent; Birmingham, Ala., 6.2 per cent; Columbus, Ohio,

3.3 per cent; Cincinnati, 2.9 per cent and New York, 1.8 per cent.

Commenting on employment conditions, Director Francis I. Jones of the Employment Service says:

"Employment conditions fail to give any indication of the substantial improvement in business activities predicted for January. The figures last month were obtained during inventory period, particularly those in the automotive industry. The slight change in the totals of all the groups shows a downward trend. Textiles and iron and steel, which have been on the upward swing for some months past, show a downward tendency in employment for the past thirty days. Railroad repair shops continue to decrease their forces. Increase in employment in metal products other than iron and steel, and in miscellaneous industries, is the encouraging feature of this month's survey.

"Reports from 231 of the principal centers show no general improvement in employment conditions. Industry is hardly holding the gains made during the past four months, and is, therefore, absorbing few, if any, of the workers released from seasonal activities and the unemployment caused by the usual climatic conditions of this season of the year. The feeling that there will be a decided change for the better by early spring is manifested by every section of the country, and seems to be based on real evidence of prosperity, and not mere optimism."

Electrical exports for the calendar year 1921 are reported by the Department of Commerce at \$97,935,597, compared with \$102,870,434 in 1920. Chief among the items recording losses were batteries, interior wiring and fixtures, magnetos and spark plugs and electric locomotives. Increases were made in motors, telephones and transformers. The entire loss took place in December, for eleven months showed \$89,039,404 in 1920 and \$92,758,321 in 1921.

Steel Pipe by the Centrifugal Process

Methods and Cost of the Cammen Process for Making Seamless Pipe at Low Cost—Competition with Welded Pipe

BY L. CAMMEN

THE publication of some data on the Cammen process of centrifugal casting of steel pipe has brought in so many inquiries, particularly as to the cost and patent status, as to make the following statement desirable.

First, as to patents: Centrifugal casting is quite old, and all the basic patents relating to casting in a chill, sand or clay mold expired many years ago. There are a number of patents on minor details such as pouring spouts of various construction, mold supports, etc., and it would be advisable for anyone who intends to go into this line to make sure that he does not involuntarily infringe on one of these patents. The fundamental features of the process are, however, free to all, and there is no reason why any good engineer familiar with the art should not be able to build a workable unit without getting into legal trouble. This does not apply, however, to processes using the hot mold.

Why a Hot Mold Must Be Used

When an ordinary steel casting is made, be it from a pattern or in an ingot mold, provision is made for the escape of gases to the top of the casting by means of a head or riser. In fact, in casting ingots special precautions are taken, such as dozzling, to keep the top of the ingot hot long enough to take up the gases and feed the contraction cavities. In a centrifugal casting there is no head or riser and the entire metal freezes uniformly throughout its length.

When the metal is poured into a cold mold, that part of it which comes into contact with the cold walls freezes at once. Theoretically in centrifugal casting, all slag and material containing dissolved gases should be thrown to the inside but, because of the high viscosity of molten steel, this takes an appreciable amount of time so that, unless the metal freezes very slowly indeed, the gas and slag particles are trapped in the cast pipe, which is then worthless.

The controlling question is therefore the time that it takes the metal to chill, which is the reason why, for example, good centrifugal castings in a cold mold have been produced in sizes of 12 in. diameter and $\frac{1}{2}$ to $3\frac{1}{2}$ in. wall, but all attempts to make good smaller casting, say of 6 in. diameter and with 0.280 in. wall, have failed; there was not enough metal in the latter case to keep the heat long enough.

In the Cammen process an extremely hot mold, as high as 2000 deg. Fahr., is used. Metal cast against a mold of such temperature cools so slowly as to give time to throw all slag and gases to the inside, and perfect castings have been obtained in sizes as small as 3 in. outside diameter, with a $\frac{1}{4}$ -in. wall not only in steel but in such a difficult metal to handle as Monel. The use of the hot mold is covered by broad claims in patents either issued or allowed.

Manufacturing Methods

One of the important features of the centrifugal process of casting is the great output per unit of spinning bench. Thus, the final designs have shown that a pipe, 16 ft. long, can be cast every 5 to 6 min. At the same time, however, such a pipe weighs only, in standard 6-in. size, about 800 lb. It is, therefore, a proposition involving a comparatively small amount

of metal at short intervals, and as such is admirably adapted to the employment of the small (6-ton) Bessemer converter, in batteries of two to three, feeding to sets of spinning benches handling various sizes of pipe.

The equipment of a plant consists, therefore, of the following: First, a furnace to heat the molds to the proper temperature. This does not differ materially from the furnaces now used in seamless tube mills for heating billets preparatory to piercing, with the only difference that better facilities for handling the molds have to be provided, as a mold weighing anywhere from 3 to 6 tons has to be rapidly shoved from the furnace into the spinning bench, and as the mold has to be carried in a cradle so as not to be distorted in handling and not lose heat too fast. These details have been fully worked out, however.

From the furnace the molds go to the spinning benches, which are simply rotating barrels with means to hold the molds centrally. They have to be built very substantial, but their cost is quite moderate. Thus, a unit to make 6-in. pipe, 16 ft. long, costs less than \$10,000. After spinning, the pipe is shaken from the mold and, while still hot, is sent through one pass of a hot rolling mill to make the surfaces perfectly smooth. As a matter of fact, if the metal is fairly clean, both the outside and the inside surfaces of centrifugally cast pipe are fairly smooth; as the amount of metal poured cannot be controlled to within very close limits in commercial operation, centrifugally cast pipe can be sold only by the outside diameter.

When alloy steel is made, the pipe has to be subjected to proper heat treatment. Instead of a regular rolling mill, a sizing machine may be used; at the same time, however, pipe made for many purposes may go out just as cast.

Cost of Centrifugally Cast Steel Pipe

Costs of this process differ, of course, with the production schedule, but the following estimate applies to a mill making each day not more than four sizes, with a total output of not less than 40 tons per hour. This schedule applies to standard pipe; extra strong is about 15 per cent cheaper, and double extra strong about 20 per cent cheaper. All costs are per ton of 2000 lb.

Metal	\$15.00
Mold (depreciation and treatment)	5.00
Heating the mold and handling	4.00
Labor (not including converters)	2.00
Inspection and supervision	1.00
Sizing	5.00
Variation	3.00
Royalty	5.00

Total cost per net ton at mill door \$40.00

The costs of alloy steel pipe are naturally a good deal higher because of the higher cost of the metal, and the additional handling, such as heat treatment, straightening, etc.

Seamless pipe is, however, not only cheaper than welded, but has certain advantages over this latter which are so obvious as not to need discussion.

Centrifugally Cast Pipe and Oil Country Trade

To-day, the vast region known as the West and South is supplied with pipe from the Pittsburgh-

Youngstown-Chicago territory, because the cost of a pipe mill is such that it does not pay to set it up except for a large and steady output. But a plant for centrifugal pipe casting costs comparatively little, and even though a small plant cannot yet (the art is, however, young, and economies may be developed) make pipe at the above price, even at \$50 a ton as a "production price in Oklahoma," Pittsburgh and Chicago mills will have severe competition, especially considering present freight rates.

Corporation and Merger Compared

This shows, by the way, an interesting light on some facts connected with the proposed merger of independent steel mills. As matters stand to-day, steel pipe is one of the most active products in the industry, and promises to remain so for some time. Of the country's capacity, roughly 3,400,000 tons, the National Tube companies control 1,350,000 tons, and the proposed merger 1,115,000 tons. As the two have an ingot capacity respectively of 22,000,000 and 6,500,000 tons, it appears that they convert into pipe respectively 7 and 18 per cent and, in dollars and cents, pipe business means to the Steel Corporation roughly 10 per cent, and to the merger 25 per cent.

Though never formally stated, it is plain that the merger if formed will be primarily for purposes of competition with the Steel Corporation. As far as pipe is concerned, the merger will have the slight advantage of location as far as Southern and Western trade is concerned, but the corporation can cut prices deeper than the merger, partly because of its stronger financial position generally, and partly because, as seen

from the above figures, it is less vitally interested in the pipe business.

Furthermore, the corporation has a more fully rounded out line of products, as it makes seamless tubing which the merger does not. And yet, with 25 per cent of its business in tubular goods, the merger has to make good in this line or it will have a difficult time in holding its own in other lines.

From this point of view, it is quite likely that the development of a radically new process of pipe manufacture, capable of delivering seamless steel pipe at something like \$40 per ton would in itself be a powerfully disturbing element. If to this be added the fact that the cost of the plant is such that it would pay to install units all through the country and thus take advantage of the present high freight rates, it will be no exaggeration to say that we may look forward to lively times in the steel pipe business.

At the same time, it must be clearly realized that a material cut in price of pipe at the present time would be highly beneficial by increasing the demand for it, and thus helping the steel industry generally. Also, availability of alloy steel pipe, in particular nickel and chrome-nickel steel pipe, will be of considerable advantage to the oil industry and in hydraulic installation work, which in its turn may create an increased demand for pipe.

To what extent welded pipe may continue to find a market in the face of a competition of seamless pipe at a maker's cost of \$40, and possibly less, per ton, remains to be seen. A big industry is not, however, wiped out at a moment's notice by the appearance of a new process or article.

ORE SHIPMENTS

Superior Total Falls Short of 23,000,000 Tons - Light Movement By Water and Rail

Statistics collected by the *Iron Trade Review* show that the total of iron ore shipped from the Lake Superior district in 1921 was 22,799,077 gross tons, or 43,859,389 tons less than the total, 66,658,466 tons, shipped in 1916. The record of these two years in the ore trade represents the two extremes in the effect of the war and its aftermath. The total in 1916 was the largest ever attained in the Lake Superior district. That of 1921 was the smallest in 17 years.

Four-fifths of all the iron ore that has been shipped from the Lake Superior district has been forwarded to the blast furnaces since 1901. In this period the average yearly shipment has been 40,870,843 tons. The tonnage of 1921 was 44 per cent below this yearly average.

Including the mine at Mayville, Wis., operated by the Steel & Tube Co. of America, and which produced 52,709 tons of ore in 1921, the total number of mines in the Lake Superior district from which ore was shipped in 1921 was 149. In 1920 the number was 237; in 1919, 240 and in 1918, 281. In 1916, the year of the maximum shipment, the number was 233.

The Oliver Iron Mining Co., subsidiary of the United States Steel Corporation, shipped 14,056,759 tons of ore from the Lake Superior district in 1921, as compared with 24,936,073 tons in 1920. The total in 1921 was 61.65 per cent of all the ore shipped, while the general average for the preceding 12 years was about 46.50 per cent. The company's proportion of the total last year was the largest it ever attained; while the amount of ore it shipped receded to practically the same figure as of 1908—14,123,957 tons. Only one new mine was opened in the lakes district in 1921, and this, on the Cuyuna range. The Maroco, of the Marquette ore Co., developed into a shipper of washed concen-

trates, forwarding 6596 tons during the season, the bulk all-rail to St. Louis.

Shipments by Port and All Rail, Gross Tons

	1921	1920	1919	1918	1917
Escanaba	1,806,656	7,367,070	4,962,358	6,774,269	7,156,854
Marquette	786,946	3,415,108	2,122,935	3,457,054	3,207,145
Ashtabula	2,264,705	8,180,852	5,915,383	7,565,608	7,597,841
Two Harbors	3,286,338	9,278,464	6,424,515	8,723,472	8,990,901
Superior	1,991,278	14,812,398	10,919,965	14,068,341	13,978,746
Duluth	9,164,803	15,479,334	16,821,269	20,567,288	20,576,419
Total by Lake	22,300,726	58,527,226	47,177,395	61,156,732	62,498,901
Total by rail	498,351	1,884,346	1,369,236	1,679,440	1,938,102
Total	22,799,077	60,411,572	48,546,631	62,836,172	64,437,003

Shipments by Ranges, Gross Tons

	1921	1920	1919	1918	1917
Mesabi	16,350,696	37,149,277	31,997,699	40,396,711	41,445,211
Marquette	1,116,900	4,668,322	2,992,212	4,351,297	4,874,150
Menominee	1,584,401	6,562,196	4,442,868	6,378,698	6,045,750
Cuyuna	2,336,193	8,763,232	6,230,839	7,936,701	7,981,684
Achilles	869,313	1,007,436	929,049	1,192,908	1,530,692
Cuyuna	488,562	1,191,528	1,861,165	2,478,806	2,422,884
Mayville	52,709	129,571	92,819	98,057	136,632
Total	22,799,077	60,411,572	48,546,631	62,836,172	64,437,003

Bessemer Limestone & Cement Co.

Joseph G. Butler, Jr., was re-elected chairman of the board of directors of the Bessemer Limestone & Cement Co., Youngstown, Ohio, at the yearly meeting. John Tod, a director of the Brier Hill Steel Co., Youngstown, was elected president. Directors are Joseph G. Butler, Jr., John Tod, R. C. Steese, Fred R. Kanengeiser, John Stambaugh, Fred Tod, Henry A. Butler, John R. Rowland, I. M. Scott and G. G. Treat.

The company shipped 750,000 bbl. of cement last year and operations indicated that its annual production could be increased to 1,100,000 bbl. annually. Its flux-stone business in 1921 was unsatisfactory, however, due to the low state of blast furnace operations.

The 1922 convention of the American Iron, Steel and Heavy Hardware Association has been fixed for May 23 to 25 at Washington. Arrangements have been made with the Hotel Washington for accommodations. The hotel is at Fourteenth Street and Pennsylvania Avenue, one block from the White House.

Association of Employers and Employees

Unique Institution in Cleveland in Which Better Understanding Is Brought About—Educational and Other Features

A UNIQUE institution is flourishing in Cleveland, of interest to men and managements of the iron and steel industries, because of what it already has accomplished in units of this industry located in the Fifth City, as well as for its potentialities for development in other cities.

"An alliance of employers and employees, with club rooms where men all may get together to study and to discuss problems of mutual interest, to meet on equal terms, to get acquainted with one another and to join for constructive thinking," is the avowed purpose of the organization, which has now been worked out with a sincerity and honesty that are no small factor in the success of the plan.

Primarily an educational institution, because its organizers hold firmly to the belief that only through mutual understanding and constructive thinking by all groups of men in industry will the problems of industry be solved, the Cleveland Industrial Association has worked out its educational features in unusual ways, bringing together employers and employees with a common interest.

For illustration, this winter the association, which by the way has employer and employee members "half and half" on its executive board and committees, has offered its members an unusual business training course. Sixteen of Cleveland's leading business men were prevailed upon to give one lecture each in a course which covered the elements of business building and constituted a comprehensive survey of modern business organization methods. Every lecture is followed by an open forum discussion of points brought out by the lecturer.

Tuesday Night Lectures

Included in the membership fee is a series of Tuesday night lectures when men of national repute bring information worth while alike to employer and employee members of the association.

The keymen of the association—the member-representatives of the organization in the various factories of the city, are co-operating with the Better Business Commission of the Cleveland Advertising Club through the association, to distribute information and literature to protect the small investor from "fly-by-night" stock salesmen who make their way through the larger plants—illustrating how far-reaching is the conception of the association in the extent of the educational service which it can render its members.

Specialized groups meet to discuss their particular problems; there is the 50-50 Club of salesman members, the Fanciful Club for those who need to become effective public speakers, and the Efficiency Club, a title which speaks for itself.

Women as well as men are found on the large list of members of the association, which includes several thousands of names from the men in the shops to the president of the Chamber of Commerce.

In addition to the classes, courses, lectures and clubs which are the activities in the club rooms during each week, opportunity for chess, checkers, cards, pool games and magazines, Saturday night dances and daily luncheons with occasional special entertainment features which bring all the members together in a social way in pleasant surroundings, fill a long-felt need.

Illustrative of the way the association's service worked out in the various plants in the city, we quote, for example, the fact that at the Van Dorn Electric Tool Co. and several other plants from which good-sized groups attend the Tuesday lectures, each weekly meeting at the association is followed by a plant meeting where the association lecture is discussed and applied to the work to be done in the industrial unit.

Another striking instance of the result of constructive thinking which fosters no special propaganda has come to the attention of the association's business manager, L. F. Mead. In one plant a rather active radical who became a member of the association and "got the idea" of men working together for the good of all, carried back to his organization ideas about bonus systems which he gathered from various fellow members and in furthering his new idea with the new point of view, became a constructive thinker in his organization.

One employer member became interested in the problem of a foreign worker, a member of the association, whose wife was being held at Ellis Island. Through the greater knowledge of the employer of the conditions governing the situation, the matter was adjusted to the satisfaction of all and the feeling of humanness established between employer and employee, who would not have otherwise gotten on a common footing except through the atmosphere of trust in the club rooms of the association.

According to Herbert Hoover, "a definite and continuous organized relationship must be created between the employer and the employee; by the organization of this relationship, conflict in industry can be greatly mitigated, misunderstandings can be eliminated and that spirit of co-operation can be established that will advance the condition of labor and secure increased productivity."

H. B. Bole, first vice-president Hydraulic Steel Co., and president this year of the Industrial Association, bases the success of the organization in Cleveland on "a sincerity of purpose which makes itself actually felt, added to the fact that the organization is based on the sound principle of mutual understanding."

President Welborn's Address

In a recent address at a meeting of employees' representatives and representatives of the company, President Welborn, Colorado Fuel and Iron Co., reviewed the year 1921, speaking in some detail of the labor troubles in which outsiders persuaded many of the men in the coal mines to strike. Mr. Welborn said in part:

In all of our negotiations we have found and it is a pleasure to report the fact that while opinions differ, as they always do among men on any important matter, we have been able after open, frank discussion, to reach practically unanimous conclusions. The lower wage scales established at the Steel Works, with the reduced scale at coal mines and the reductions that have been made in freight rates on raw material, have made possible the resumption of operations at the steel plant on the moderate basis laid out to be in effect next week.

The boards will continue, as heretofore, to give you the facts about business conditions and the best information possible as to outlook. We will continue to negotiate with you any changes in wages and working conditions, in accordance with the provisions of the joint representation of employees and management under which we are working. We will, therefore, naturally resist in every legitimate way all efforts to prevent the carrying out of agreements entered into between employees and management, such agreements to always be proper and lawful.

Engineering standards issued in 1921 by foreign national standardizing bodies have been compiled by the American Engineering Standards Committee and copies can be furnished at a nominal cost or they may be consulted at the offices of the committee, 29 West Thirty-ninth Street, New York. Included among these standards are 13 British standards, 2 each from Canada, Austria and Belgium, 12 from Holland, 11 from Switzerland, and 62 from Germany.

Steel Corporation Pension Disbursements

A total of \$947,879.15 in pensions was paid to retired employees of the United States Steel Corporation and its subsidiary companies during 1921, according to the eleventh annual report of the United States Steel and Carnegie Pension Fund just made public. This is \$168,112.55 more than was disbursed in 1920, and is the largest amount paid out in any year since the establishment of the fund in 1911. There were 3677 participants, 2969 being on the list at the beginning of 1921 while 708 were added during the year. There were 240 discontinuances because of death or other causes, leaving 3437 active participants as of Jan. 1, 1922.

The total amount disbursed since the establishment of the fund is \$6,828,460.75. The average age of the pension participants for the past 10 years has been 66.10 years, the average term of service 30.95 years and the average monthly pension \$24.10. The beneficiaries make no contribution to the fund. The money is derived from a trust fund of \$12,000,000 established by Andrew Carnegie and the Steel Corporation.

Retired employees of the Carnegie Steel Co. in 1921 received \$204,470.70; those of the American Steel & Wire Co., \$185,201.45; of the American Sheet & Tin Plate Co., \$125,404.20; of the National Tube Co., \$106,205.47; of the H. C. Frick Coke Co., \$80,485.99, and of the American Bridge Co., \$75,194.33.

Men retired from general office staffs, including the Steel Corporation general office in New York, received \$17,962.85, and former employees of sales departments were paid \$7,469.

Lead and Zinc in 1921

The mine and smelter output of lead in the United States in 1921 each fell off about 20 per cent and the mine and smelter output of zinc each declined nearly 60 per cent, according to C. E. Siebenthal and A. Stoll, of the U. S. Geological Survey, compiled from reports and estimates by producers and others. Data for the Western States are taken from the advance statements issued by the Geological Survey's western offices. Statistics of imports and exports are taken from the records of the Bureau of Foreign and Domestic Commerce for 11 months, and an estimate is made for December.

The output of soft lead by mines of the Mississippi Valley was about 231,000 short tons, and that of argentiferous lead by mines of the Western States was about 170,000 tons, a total of 401,000 tons. The corresponding figures for 1920 are 251,816 tons from the Mississippi Valley (including the small output of the Eastern States) and 259,070 tons from the Western States, a total of 512,865 tons. The recoverable zinc content of ore mined in 1921 was about 250,000 tons, as compared with 584,772 tons in 1920 and 549,242 tons in 1919.

The output of primary domestic desilverized lead in 1921 was about 190,000 net tons, of soft lead about 145,000 tons, and of desilverized soft lead about 55,000 tons, making a total output from domestic ores of about 390,000 tons of refined lead, as compared with 476,849 tons in 1920, which was made up of 220,327 tons of desilverized lead, 189,854 tons of soft lead, and 66,668 tons of desilverized soft lead. The output of lead smelted and refined from foreign ore and bullion was about 50,000 tons, as compared with 52,808 tons in 1920. The total lead smelted and refined in the United States was thus about 440,000 tons, as compared with 529,657 tons in 1920. The output of antimonial lead was about 8,000 tons, as against 12,535 tons in 1920.

The output of primary metallic zinc from domestic ores in 1921 was about 194,000 tons and from foreign ores about 2,500 tons, a total of 196,500 tons, as compared with 450,045 tons from domestic ores and 13,332 tons from foreign ores, a total of 463,377 tons in 1920. In addition to primary zinc there was an output of about 17,000 tons of redistilled secondary zinc, as compared with 21,371 tons in 1920, making a total supply of distilled zinc and electrolytic zinc in 1921 of 213,500 tons, of which 31,500 tons was high grade and intermediate, 32,000 tons select and brass special, and

150,000 tons prime western. The output of the corresponding grades in 1920 was 114,606, 59,811, and 310,331 tons, respectively, a total of 484,748 tons.

The exports of zinc made from foreign ores were about 1260 tons and those of zinc made from domestic ores were about 3200 tons, as compared with exports of 28,368 and 85,898 tons, respectively, in 1920.

The two largest zinc rolling mills have added zinc shingle machinery to their equipment. This use of sheet zinc is one of the most promising now being developed.

Kentucky Troops Again Sent to Newport

Governor Morrow of Kentucky has ordered 350 National Guardsmen to Newport, Ky., where a strike is in progress at the plant of the Newport Rolling Mill Co. The troops had been stationed in Newport for five weeks, but were withdrawn on Jan. 28 on receipt of intimations that the civic authorities were able to handle the situation. Since the troops were taken away, a reign of terror has existed and on Wednesday night it is estimated that 3000 shots were fired in the vicinity of the mill. The situation became so tense that a tank company from Covington, Ky., was called out at midnight to maintain order. In connection with this strike Governor Morrow issued two statements, one to the press and another proclamation addressed to the people of Newport. These statements are interesting as showing conditions existing in that city at the present time and also as to what conditions officials of the rolling mill company are forced to contend with in trying to operate their plant. As a result of the lawlessness which has existed in Newport for some time, several large manufacturing plants have about decided to remove their plants from that city across the river to Ohio.

Governor Morrow's proclamation upon sending troops to Newport is as follows:

To the People of Newport:

Law, order and security do not exist in Newport. For the past week a reign of terror has existed. Men have been shot down in the open streets. Citizens have been assaulted and beaten. Women have been abused and insulted. Men have been threatened and intimidated. Homes have been fired into and the torch has been applied. Lawlessness - brazen open and defiant has been supreme. Your peace officers advise me they are powerless.

I am sending the National Guard troops of the commonwealth of Kentucky to put an end to this condition. Any one who fires upon, strikes or insults a State trooper fires upon, strikes and insults Kentucky, and will be treated accordingly.

The manhood and conscience of Newport must assert itself. I call upon every power of the city which stands for supremacy of law to co-operate with the troops. I call upon every law-abiding citizen of Newport to stand up and be counted for the law of the land. Violence and terror have existed. They must cease to exist. Lives have been threatened and endangered. They must be made safe and secure. Newport has been disgraced and dishonored. The cause of this disgrace and dishonor must cease.

EDWIN P. MORROW,

Governor of the Commonwealth of Kentucky.

Feb. 2, 1922

Great Bridge Proposed

The Mackinac Development Co. has been organized to investigate the feasibility of building a bridge across the Straits of Mackinac, or a tunnel under the straits. Engineers believe that the most feasible route for a bridge would be between Cheboygan, Mich., and St. Ignace, Mich., utilizing several islands in the straits. Charles Evan Fowler, consulting engineer of New York, has been retained to do the investigation work. The board of advisors on the project includes Prof. H. E. Riggs, University of Michigan; Prof. M. E. Cooley, dean of engineers, University of Michigan; George H. Pegram, chief engineer of the Interborough Rapid Transit Co. and Prof. William H. Burr, consulting engineer of New York.

The Wheeling Steel Corporation this week will ship down the Ohio River to Memphis, Tenn., two barge loads of steel pipe, the shipment aggregating 1700 tons.

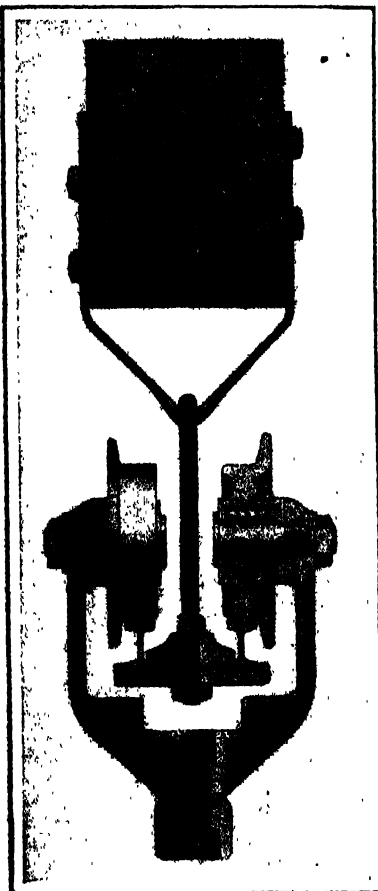
Double-Rail Overhead Conveying System

Safeguards Against Track-Jumping—Trolleys Have
Two, Four or Eight Wheels—Can Carry
Load of 3000 Lb.

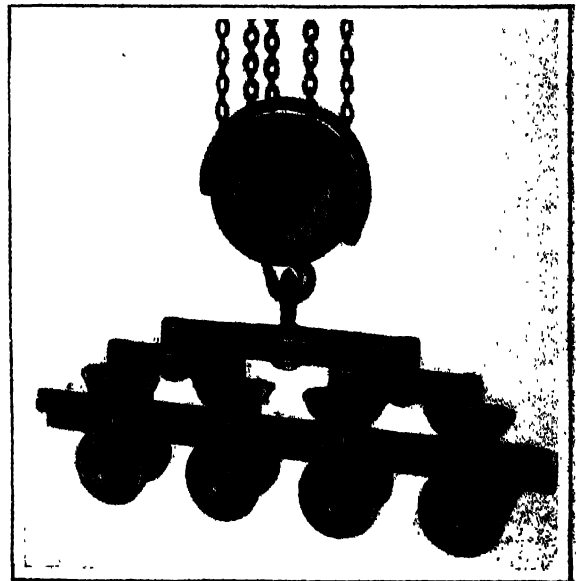
BY G. L. LACHER

THE Dreis & Krump Mfg. Co., 2909-23 South Halsted Street, Chicago, has put on the market the "Atlas Carryall" overhead conveying system, designed to meet the demand for simple, safe, reliable and relatively inexpensive equipment for moving material in plants where the usual load does not exceed 3000 lb.

of an inch. The track consists of two parallel rails, double rail construction having been adopted in preference to the usual monorail type to minimize the possibility of the trolley jumping the track. The rails are laid on a plate to which the U-bolt hangers are bolted, the supporting nuts being on the bottom of the plate. Thus the rails are supported from the bottom instead



Double Rail Construction Was Adopted for This Overhead Conveying System Because That Design Was Regarded as the Best Insurance Against Trolley Jumping. The rails are supported by a plate suspended by U-bolt from overhead brackets and are held in place by a cast-iron wedge through which the U-bolt passes. That side of the base of the rail under the wedge is wider than the outer side, hence the center of gravity of each rail is thrown inside of the web, thereby minimizing the possibility of the rails becoming dislodged and turning outward.



An Eight-Wheel Trolley Is Made Up of Two Four-Wheel or Four Two-Wheel Trolleys. A four-wheel trolley is made up of two sets of two-wheel trolleys, joined together by a connecting bar, and two four-wheel trolleys similarly connected form an eight-wheel trolley. The latter will handle a load up to 3000 lb.

The construction is such as to make it unnecessary in many plants to erect a superstructure from which to suspend the system. In buildings in which wooden joists project from the ceiling, supporting brackets may be fastened directly to the joists. Brackets suitable for fastening to steel roof trusses have also been provided, while for reinforced concrete ceilings special inserts have been devised.

Hanging from the brackets are U-bolts which support a track on which the material handling trolleys operate. Both legs of the U-bolt are threaded so that the position of the track is adjustable within a fraction

of the top, this design having been selected to eliminate the danger of the rails becoming dislodged and dropping to the floor. To further insure the stability of the track, the company uses a special rail section, the base of which is wider on one side than on the other. When the rails are placed on the supporting plate the wider bases face each other and upon them is superimposed a wedge through which the legs of the U-bolt pass. The wedge holds the wide bases of the rails in place. By throwing the center of gravity of each rail toward the middle of the track, the possibility of the rails being forced out of position and turning outward is reduced.

Throughout the design of the Atlas Carryall system principles of safety and stability were given heed. Thus the clearance between the track supporting plate and the trolley frame was made as small as possible as an additional safeguard against trolley jumping. In other words, in such a rare case where the trolley might jump, the frame would strike the supporting track

Switches Are of the Movable Tongue Type. Separate right and left-hand two-way switches are unnecessary with this system, the one switch, shown in the illustration, sufficing for both types of turns.

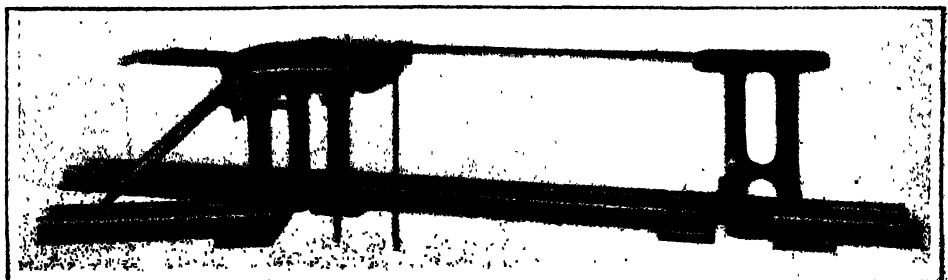


plate before the trolley wheels could leave the rails. Any tendency of one wheel to leave the rail upon which it operates is overcome by the contact of the flange of the opposite wheel against the head of the other rail.

The trolley wheels are of cast iron, which material is strong in compression. The wheels rotate on Hyatt roller bearings, all turned and bored to limits of plus or minus 0.002 in. The bearings are spiral and alternately left-hand and right hand, throwing oil in opposite directions and drawing dirt and dust into their hollow centers, thereby leaving the surface smooth. The bearings are incased in a hardened steel sleeve pressed into the bore of the wheel, with dust-proof washers at each end outside of which are thrust washers. The bearings revolve around a hardened steel pin with a Brinell test of 200 to 225.

The trolley frame is made entirely of steel castings, and all surfaces in contact are machined. The smallest trolley made has two wheels. A four-wheel trolley is made up of two sets of two-wheel trolleys, joined together by a connecting bar which is supported by pins having unusually large bearing surfaces. The four-wheel trolley will handle a load up to 1500 lb. The eight-wheel trolley, which consists of two four-wheel trolleys joined together, takes a burden up to 3000 lb. The pins and the hooks are drop-forged. Bumpers are integral with each pair of trolley wheels, so that two or more trolleys can be pushed along together without the wheels bumping each other.

Switches are of the movable tongue type, instead of the sliding type. The hinged end of the movable tongue is of such construction that there are no ill-fitting joints for the trolley wheels to jump over. Although a connecting pin has been inserted at the hinge as a safety precaution, the tongue actually rotates in a semi-circular lapped joint, so that practically a continuous and uninterrupted surface is provided for the trolley wheels to pass over at the junction of the track and the tongue. The switches are so guarded that a trolley cannot run off the end of the track, either when it is open or when the tongue is being moved from one position to another. Except when the switch is exactly connected, a guard, which rests on the track, bars the progress of the trolley. Both two-way and three-way switches are supplied. Separate right- and left-hand two-way switches are unnecessary with this system, the one switch sufficing for both types of turns.

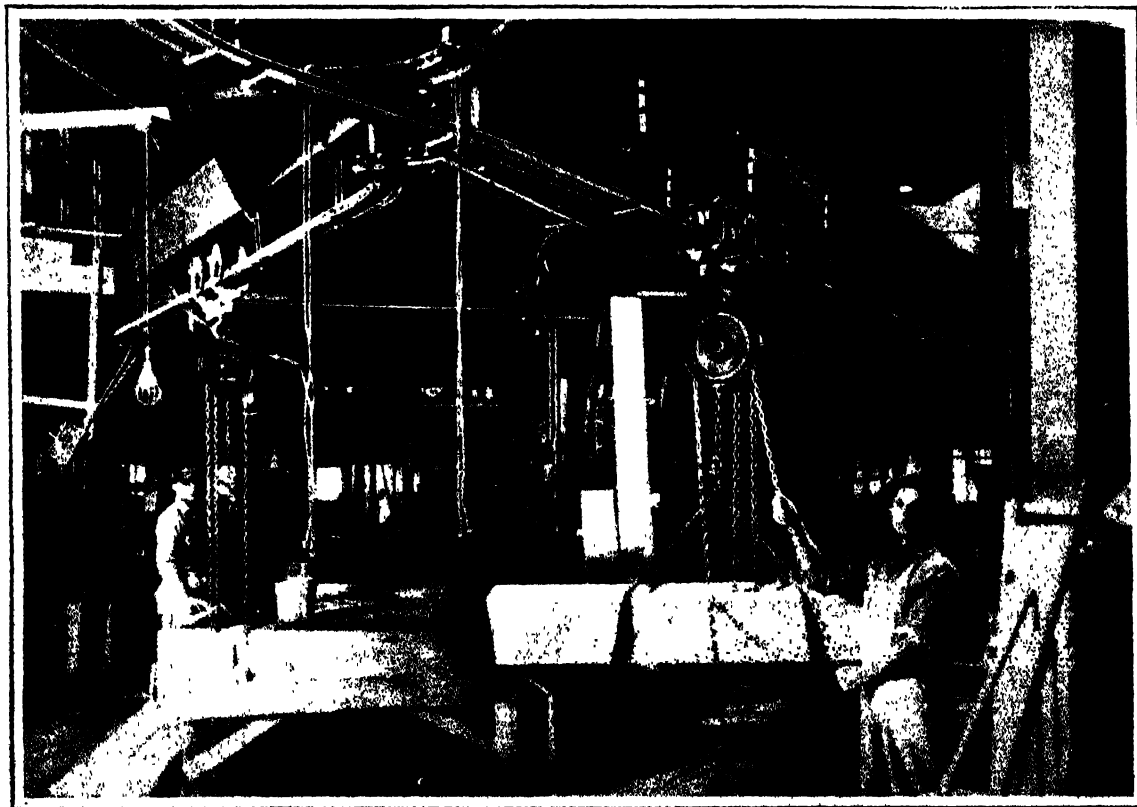
It is claimed that the Atlas carry-all system may be installed by any mechanic. The rails, which are 2½-lb. sections made from new billet stock, may be bent at the place of installation to suit the requirements of the job. For this purpose the Dreis & Krump Mfg. Co. has supplied a special bending iron. This is a steel casting, which may be fastened to a column and in which the rails may be bent by hand to any degree of curvature



Special Bending Irons Have Been Provided So That the Rails May Be Bent at the Place of Installation to Any Degree of Curvature Desired

desired. In fact, rails have been bent down to a 10-in. radius without interfering with the operation of the trolleys thereon.

The American Society of Mechanical Engineers, the American Institute of Mining and Metallurgical Engineers, American Institute of Electrical Engineers, American Society of Civil Engineers, Illuminating Engineering Society, New England Water Works Association, and the American Society of Heating and Ventilating Engineers were well represented at the thirteenth annual engineers' dinner held Tuesday evening, Feb. 7, at the City Club, Boston. President Lowell, Harvard University, spoke on the Armament Conference in Washington, and Philip Cabot on the engineer's opportunity.



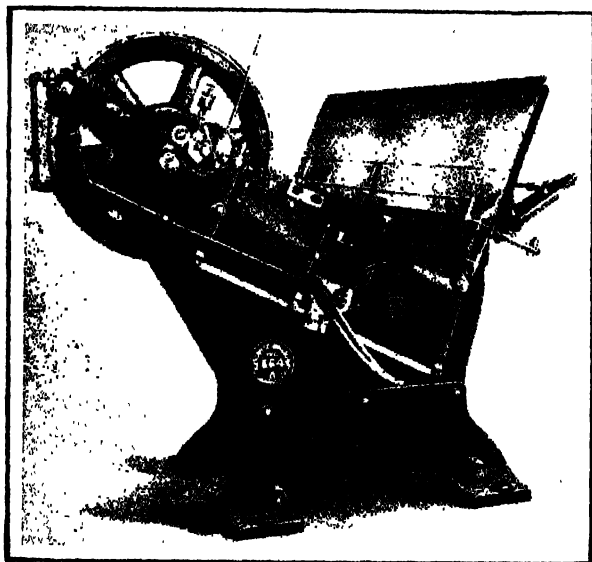
The Four-Wheel Trolley Shown Is Carrying a Concrete Stair Tread Weighing 1200 Lb. The photograph was taken in the plant of the National Mosaic Tile Co., Chicago, where an Atlas system has been installed

New Automatic Stagger-Feed Press

An automatic stagger-feed press for the economical production of jar closures, can tops and bottoms, small shells and similar work has been developed recently by the Adriance Machine Works, Inc., 80 Richards Street, Brooklyn, N. Y.

The staggered arrangement affords a saving in metal, blanks being punched with but a thread of metal between them. The simplicity of construction is a feature, the press having fewer parts than the usual design. It is claimed that over 100 blanks a minute from 1 to 4 in. in diameter can be accurately punched out, the quantity decreasing or increasing according to the size of the work.

The press, which is designated the No. 564 A, is shown in the accompanying illustration. An outstand-



Automatic Stagger-Feed Press for Production of Jar Closures, Can Tops and Bottoms, and Similar Work

ing feature is the continuous action of the punch while the sheet carrier travels in either direction. It is not necessary for the carrier to return to the starting point after punching a row, for the moment the end of a row is reached the action is reversed automatically and the next row punched out as the carrier returns to the starting point.

When the last blank is punched from the sheet the carrier is automatically stopped and stands ready to receive another sheet. This arrangement is said to enable the operator to run several presses and to turn out over 100,000 blanks per day. There is only one die. Scrap is ejected automatically and cut into skeleton frames. The design provides for the safety of the operator, as at no time are his fingers near the die while the press is running.

To Investigate Waste in Industry Report

The report on elimination of waste in industry made under the direction of the Federated American Engineering Societies is now under study by members of the National Industrial Conference Board. The members have been urged to consider the report in detail in order that they may corroborate and further emphasize statements in the report or conclusively prove the fallacy of statements of the report. It appears that some of the members of the National Industrial Conference Board are of the opinion that parts of the report reflect the truth but that others are contrary to fact, and while the true ones should be strongly supported, the incorrect statements should be refuted. As the analyses are received, it is the plan of the board to prepare a statement for general publication. The investigating movement is a commentary on the interest developed in the report, and also a commentary on the authority which the report is believed to possess through the fact that the committee was appointed by Herbert Hoover, while president of the federation.

THREE COMPANY MERGER

Negotiations of Steel Companies in Trying to Get Together Still Pending

CHICAGO, Feb. 7.—Notwithstanding reports to the contrary, negotiations are still under way toward the three-company consolidation of independent steel mills. Conferences of the interested parties were held in Chicago and New York last week and another meeting will take place in New York Feb. 13.

As yet the three companies have not come to an agreement on the valuation of their properties. Another difficulty lies in the fact that one of the parties to the negotiations has exceptionally heavy raw material holdings which are largely covered by bonds, the interest on which is rather a heavy burden under present conditions. It is intimated, however, that progress is being made toward a solution of these problems.

Youngstown Company May Build at Chicago

YOUNGSTOWN, Feb. 7.—In case the proposed independent steel merger involving the Youngstown Sheet & Tube Co., Inland Steel Co. and the Steel & Tube Co. of America, the latter two interests of Chicago, fails to materialize, it is understood the local interest will establish a Chicago district pipe connection. In fact, construction of a tube mill plant in the West has been considered by the Sheet & Tube company for some time, and it is reported in some quarters that land for a new plant has already been optioned.

That the proposed consolidation has struck a snag in the demands of Inland Steel, which may prove insurmountable, is current comment. Consequently the possibility of developments, should the combine fall through, is being extensively discussed.

It is currently reported that not only has Inland Steel failed to adequately mark down its holdings to meet the idea of the other companies, but is demanding a substantial sum for its position in the Chicago district.

On the other hand, it is felt that difficulties encountered in connection with the high bonded indebtedness of the Steel & Tube Co. and its appraised value may be reconciled.

On account of the attitude of the Inland Steel Co. there was considerably less optimism in well informed circles in Youngstown this week as to the ultimate success of the plan.

In fact, there were hints in some quarters that the inability of the conferees to come to an agreement might be openly recognized and admitted within a short time. Efforts might still be put forth, it is explained, toward effecting an amalgamation even though such admission were made.

It is claimed that the investigations and compilations have developed the fact that the Sheet & Tube company is on a low cost basis with respect to pipe production as compared with Chicago district makers. On the other hand, the latter enjoy an advantage in freight rates on shipments to the West and Southwest, through their location.

The possibilities of a merger with the Jones & Laughlin Steel Co., Pittsburgh, which is to establish a Western plant, have been thoroughly canvassed, it is understood, but the latter interest has refused to entertain any consolidation proposal.

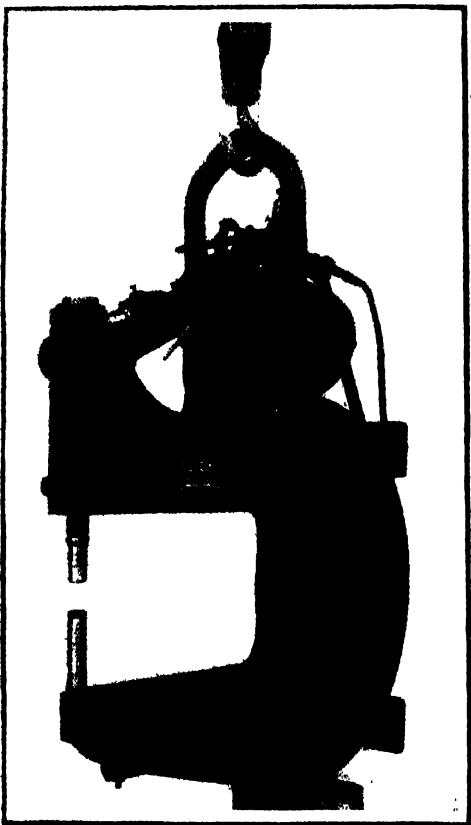
Miners' Time Lost Through Strikes

WASHINGTON, Feb. 7.—Supplementing the statistics of man-days lost on account of strikes, the United States Geological Survey this week presents data as to the man-days lost through other causes. In the 20-year period, 1900-1919, the operators reported a total loss of 124,747,199 man-days through strikes, but the loss attributable to other causes was 1,053,576,000 man-days, or eight and a half times as great as the strike loss. To put it another way, in two decades American coal miners lost 10.5 per cent ascribable to strikes and 89.5 per cent to other causes, chief of which are no market, coal shortage, and mine disability.

New Line of Pneumatic Riveters

A line of pneumatic riveters of the type shown in the accompanying illustration and in various capacities from 10 to 150 tons has been placed on the market by the Southwark Foundry & Machine Co., Philadelphia.

The machine is of the compression yoke type using a toggle action to give movement to the die, which advances rapidly to the rivet, decreasing in speed and increasing in pressure as it travels. The die travels a sufficient distance at practically uniform speed and rated pressure to assure satisfactorily driving tight rivets, drawing the plates together and following up



The Die Is Set for a Run of Work So That the Rivet Is Headed When Piston Has Made Three-Quarters of the Stroke

the shrink of the rivet with full pressure until it takes its set. It is not necessary to drive the rivet at the end of the die travel or piston stroke. The die is set for a run of work so that the rivet is headed when the piston has moved through $\frac{3}{4}$ of the stroke, thus allowing sufficient die travel at full pressure on either side of this position to take care of variations in length of rivets, thickness of plates, dimensions of holes, etc. This obviates the necessity of further adjustment of the die screw.

The operating valve is of the plain slide type, requiring but one simple wick packing on the stem end and having a removable valve seat for ready regrinding. It is further provided with means for using line pressure in the pull back. Two separate pressures on the rivet die can be obtained by turning a plug cock in the valve plate, admitting air at full pressure in the pull back area. This reduces the pressure to the next lower tonnage rating, that is, a standard 50-ton machine is arranged to develop both 50 and 100 tons on the die. Special equipment such as pressure regulating valves, auxiliary storage tanks, etc., are eliminated in this design.

The riveter frames are steel castings of I-beam section. All portable machines are provided with suspension, and above 36-in. reach, with feet for stationary position. The reach of the smallest machine is 4 in. and the gap 10 in., the same dimensions for the largest machine being 21 ft. 6 in. and 18 and 24 in. gap. The cylinder diameters are $7\frac{1}{2}$ to 20% in.

High Carbon in Weldless Steel Tubing

An account of experiments conducted with high and low carbon steels was presented at a joint meeting of the Institution of Automobile Engineers and the Birmingham Metallurgical Society, Birmingham, England, by W. W. Hackett.

Experiments on aeroplane tubing during the war showed that excellent results could be obtained by using 0.5 per cent carbon steel tubing giving in the bright or blue state a yield of 40 to 45 tons per sq. in., and an ultimate stress of 45 to 50 tons per sq. in. In the motor trade there was a disinclination to use these high carbon steel tubes, which it was thought would necessarily be brittle. No extra care had been used in heat treatment, but the result of hundreds of tests carried out showed that 0.3 per cent carbon was always better than 0.15 per cent, and 0.5 invariably superior to 0.3 per cent.

Details were given of a number of these tests. In one series 20-gage tubing made of 0.54 per cent carbon steel had practically as long a life under the same weight and shocks as 17-gage tubing manufactured of 0.338 per cent carbon steel. Figures were given showing the greater strength of high carbon than of medium and low carbon steels. One experiment showed that a 20-gage high carbon steel was practically as strong as a 15-gage low carbon steel, though only half as thick. This was attributed to the fact that after undergoing the brazing process the elastic limit of a 0.5 per cent carbon steel was about twice as high as that of a 0.15 per cent carbon steel at the brazed joint, and consequently the high carbon steel was able to stand much more stress than the low carbon. It was also concluded that the high carbon quality had twice the life of a low carbon when subjected to the same fatigue.

In a discussion which followed, A. E. Tucker called attention to the fact that silicon had a great effect upon the mechanical properties because of its influence on carbon, and it should always be taken into account in connection with the carbon content.

Explosion at a Frick Mine

UNIONTOWN, PA., Feb. 6.—Investigations into the fatal disaster at the Gates plant of the H. C. Frick Coke Co. in which 25 men were killed got under way to-day with the arrival of Seward E. Button, head of the State Department of Mines. Coroner S. H. Baum held a preliminary conference with Frick and State officials to-day and will meet with them again on Monday. Cause of the blast has not been determined.

Damage to the Gates mine was comparatively small, the disaster being confined to one section, known as the Ross section. The disaster was the first serious Frick accident since 1891 when approximately 100 men lost their lives in an explosion at the Mammoth plant.

Shipping Steel by River

PITTSBURGH, Feb. 6.—Preparations are being made by the Jones & Laughlin Steel Co. to make up and send down the rivers early in March one of the largest tows of steel products ever shipped by water. It is anticipated it will exceed any previous barge movement by several thousand tons. Up to the present, this company has delivered more than 500 freight carloads of its products in its steel barges to consumers in the Ohio and Mississippi Valleys. Delivery by barge is said to be a couple of dollars a ton cheaper on the average than delivery by rail.

Ford Blast Furnace Breaks Its Record

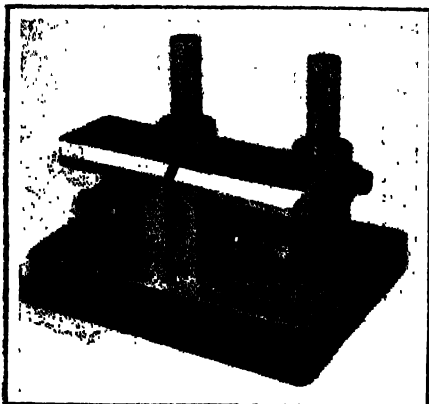
All previous records for production and for coke consumed per ton of iron of the Ford Motor Co.'s A furnace were broken in January. The record was as follows: 18,278 tons of pig iron. Average per day 604 tons. 1791 lb. of coke per ton of pig iron. Of this iron 1157 tons was foundry iron averaging 3.50 per cent silicon. The rest was malleable iron, the silicon ranging from 1.00 to 1.87 per cent. The best day's run was 701 tons.

Universal Drill Fixture

A universal drill fixture intended to save time by providing a quick and accurate means of holding parts of any shape for drilling, is being offered by the Hartmann Mfg. Co., Hartford. It is primarily for use in tool rooms and in shops doing job work.

As shown in the illustration, the fixture consists of a base ground for a layout table, with two angle irons swinging on horizontal arms which can be raised or lowered. The angle irons are ground on one side to 45 deg., making a V-block with its mate, the other side having a groove to hold the work in place. The angle irons are interchangeable in any position.

The entire fixture is 10 by 12 in. with a working



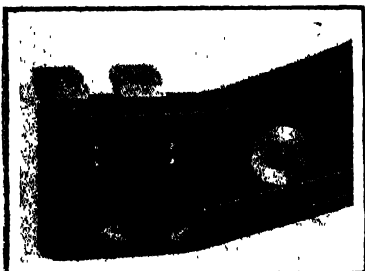
The Fixture Is Strapped to a Drill Press Table. It is intended to save time on work requiring use of parallels, angle irons or V-blocks.

height of 8 in. from the face of the table. The surface of the base is ground for a layout table 5½ by 12 in. The construction is rigid, the fixture being designed so that a ¼-in. drill will produce a plus or minus deflection of not more than 0.002 when the drill is on the extreme edge of the angle iron at the extreme height. The angle iron can be locked solidly in any position on the studs, which are of steel, hardened and ground.

The device is said to do everything that can be done with parallels up to 8-in. in height, V-blocks up to 9 in., or angle irons of this size, and variety of work in addition. Thin flat stock can be held and drilled in the grooves of the angle irons. Triangular and V-shaped pieces are held easily and accurately in place, and round tapered parts are said to give no trouble. Work requiring blocking can be placed on one angle iron and the other angle iron adjusted to the right height and locked in a few seconds.

Square Anvils for Trus-Form Gages

Trus-Form gages offered by the Pratt & Whitney Co., Hartford, and described in THE IRON AGE, June 30, 1921, may now be obtained with large square-head anvils as shown in the illustration. The adjustment



Square Anvils Permit Working to a Shoulder. This type is interchangeable with round head type.

and locking device is the same as that previously described, two opposed headless set screws working in the frame pulling against each other. Square anvils permit working up to a shoulder and give a larger wearing surface. This type of anvil is interchangeable with the round-head type and new anvils may be substituted at any time.

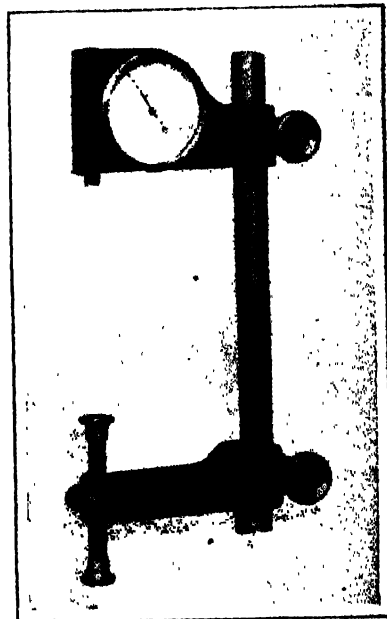
The Favorite Stove & Range Co., Piqua, Ohio, has resumed operations in its foundry which has been closed down since late in December.

Extension-Beam Indicating Caliper

The indicating caliper shown in the illustration, has been placed on the market recently by the H. W. Horstmann Co., Irvington, N. J. It is designated as the No. 20 and is intended for work beyond the capacity of the company's regular instrument. It is adaptable for use on the planer for duplicating widths on flat work and on the lathe for chuck work, especially in gaging across large diameters. It shows visually either the amount of stock still to be removed or how much the work is undersize at any stage of its making.

The caliper is set by placing a sample of the desired length between the plunger and the adjusting screw. The latter is then advanced until the indicator registers zero, and then locked. The dial is graduated to show the movement of the plunger in thousandths of an inch and variation in the lengths of pieces placed between the plunger and the adjusting screw is shown by the distance the indicator moves from zero.

The rear surface of each arm is finished flat. To bring the plunger and the adjusting screw in alignment it is only necessary to lay the instrument face upward on a flat surface. Tightening the clamping screws rigidly locks the arms on the beam. The beam is regularly 6 in. long and of ½ in. round cold rolled steel, a size of stock usually found in any shop and therefore any length of beam can be conveniently made up. By reversing the position of the arms on



WEAR WILL NOT Affect Accuracy, as Zero, the Only Important Point on the Dial, Is Always Fixed by Adjustment

the beam, the instrument becomes an inside indicating caliper for large diameters, the minimum diameter that can be measured under these conditions being 4¼ in.

Jones & Laughlin Steel Co. Plans

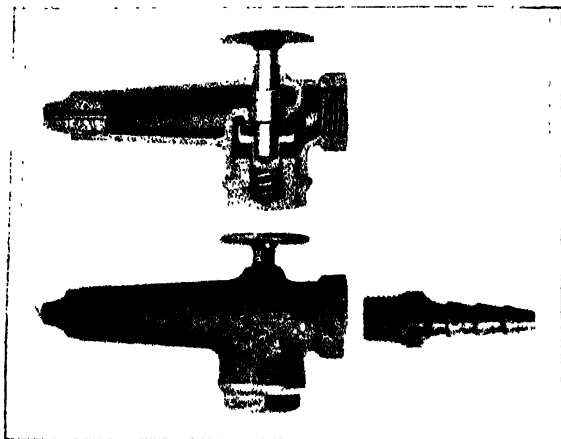
The second step in the development of the Jones & Laughlin Steel Co. project at Hammond, Ind., was taken when articles of incorporation were filed by the Adelaide Land Co., which was organized to purchase the 900-acre site for the plant to be constructed by the steel company. The incorporators of the land company are members of the organization of the Fletcher Savings & Trust Co., Indianapolis, which represented the Jones & Laughlin Steel Co. in the negotiations for the land. Transfer of the land to be bought by the land company to the steel company will be made shortly, it is said.

Hausman & Wimmer Co., First National Bank Building, Pittsburgh, has purchased the old South Street bridge, Philadelphia, which is being razed to make way for a new structure. There are about 1000 tons of wrought iron in the old bridge, which the buyers will scrap.

Air Gun for General Dusting

The accompanying illustration shows an air gun recently placed on the market by Jenkins Bros., 80 White St., New York.

The features emphasized are that it holds tight under pressure, when closed, thereby eliminating leakage and consequent air waste; and that it quickly responds to the press of the button, freely emitting the air. A renewable disk of special design is intended to form perfect contact on the seat and take up the



Air Gun for Foundry and Machine Shop Use

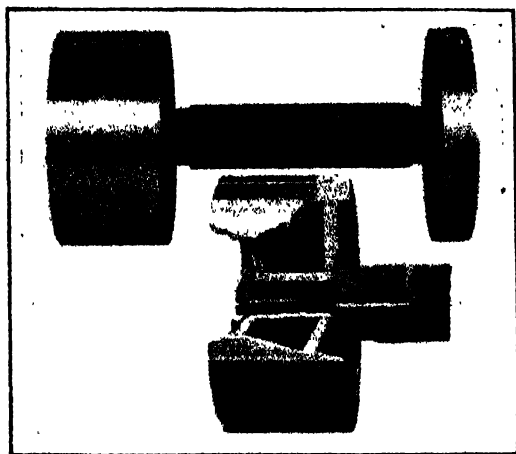
wear caused by hard usage. Each valve is cast of steam bronze. By the use of different hose nipples the gun is adaptable to $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. hose pipe.

In foundries the gun can be used in blowing off cores, cleaning core boxes, flasks, patterns and for general dusting, in place of hand bellows or brushes. In the machine shop it can be used for blowing out chips, cleaning tools, benches, etc. It can be used in forges for tempering tools, and in many other places where air is used for cleaning or drying purposes.

Large Sizes of Trilock Plug Gages

The Trilock plug gages manufactured by the Pratt & Whitney Co., Hartford, and described in THE IRON AGE of Sept. 1, 1921, are now offered in sizes of $2\frac{1}{2}$ in. and larger diameter.

The large gages are made hollow for lightness, the construction being shown in the accompanying illustration.



The Go Plug Is Lightened by Web and Flange Construction

tions. The hollow construction applies to the "go" plug being lightened by a web-and-flange construction. The two disks shown are forced into the ring on a taper before grinding and grip the central tube, holding the parts securely. The reversible feature is intended to provide double the usual wearing surface. Three prongs on the handle are forced into three

grooves in the bushing, providing a three point self centering tripod support without rock or shake. The washer at one end and the handle at the other bear on both the stay-tube and the disks, binding the assembled gagehead to the handle.

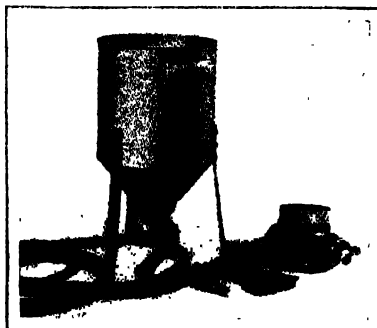
Reversible and renewable-end Trilock gages can now be had single and double end, threaded in all sizes above $\frac{1}{2}$ in., and plain cylindrical in all sizes $\frac{5}{16}$ in. and above.

Small Hose Sand Blast

A small hose machine sand blast, a recent addition to the line of the Pangborn Corporation, Hagerstown, Md., is shown in the accompanying illustration. Although small enough to be picked up and carried, it is said to be a practical design and to do the work of any sand blast.

The hose machine consists of a suction-type gun with the blast action controlled by a trigger in the handle. Compressed air passing through the air jet creates a vacuum by which the sand or metallic abrasive is brought from the hopper to the gun body. The gun body forms a mixing chamber for the air and abrasive, which is given a swirling action, similar to that produced by the rifling of a gun barrel. This design, it is claimed, produces a most effective blast stream.

It operates at pressures from 5 to 100 lb. Interchangeable nozzles are provided, adapting the apparatus to plants having a small volume of compressed air or a small amount of work. There is a small cabinet which sets over the hopper. This provides an



The Gun Is of Suction Type with Blast Action Controlled by Trigger in the Handle. A small cabinet sets over the hopper

economical means of cleaning small parts, furnishing a complete, self-contained, continuous cabinet sand blast.

Demand from Poland for Machine Tools

WASHINGTON, Feb. 7.—Increased demand for machine tools, railroad equipment, etc., in Poland is likely, says Trade Commissioner Smith, in consequence of the acquisition of territory in Upper Silesia, where there are large industrial establishments which formerly received their supplies chiefly from Germany. The report says the Germans are likely to be strong competitors with the United States for supplying machinery and equipment. Hitherto the German Government has actively discouraged the export of German goods to Poland, but under the decision of the League of Nations dividing Upper Silesia, Germany is required to permit free exportation into that part of Silesia which has been assigned to Poland and in any case German commercial and industrial interests are putting pressure on the Government to relax any restrictions against sales into Poland and the German Government as a result is said to have issued instructions that no obstacles should be placed in the way of export to Poland of machinery, construction materials and locomotives. The report says American manufacturers would do well to take prompt measures for securing trade in these classes of goods in Poland and that in particular there might be immediate prospect for the sale of railroad cars to the Polish State railroads.

The Donner Furnace of the Donner Steel Co., Buffalo, banked several weeks ago, started Feb. 1. The stack now in blast was blown out after a minor accident.

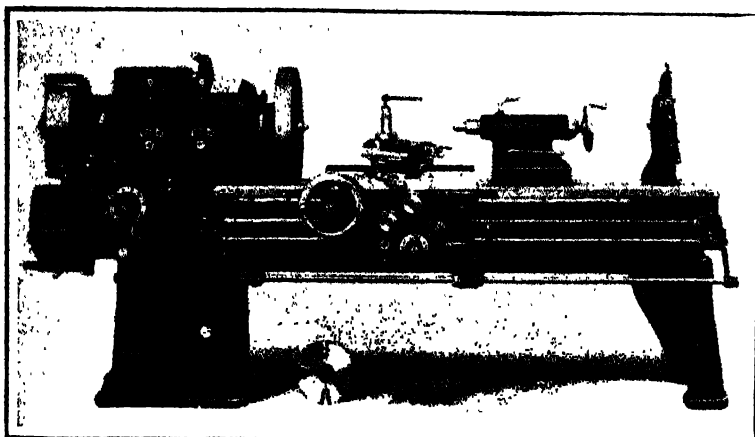
New 18-In. Coneless Engine Lathe

The accompanying illustrations show the new 18-in. coneless engine lathe which is being placed on the market by the Boye & Emmes Machine Tool Co., Cincinnati.

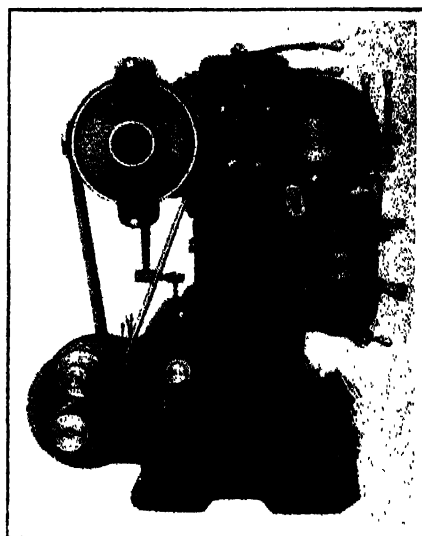
The separate view of the headstock with cover removed shows the arrangement of shafts, clutches, gears and levers for speed changing. All levers are either drop forgings or steel castings and the main spindle bearings can be adjusted, without removing the top cover. The top cover is provided with a removable plug for filling the headstock with oil, and a glass oil tube

The mounting of the motor is shown in the end view illustration. The cabinet leg has two planing strips, the top strip having a slot planed the entire length and being jig drilled and tapped. The motor-base plate is jig drilled to match the cabinet leg, the plate carrying an idler pulley running on S K F ball bearings, to provide proper belt tension. Any standard make of constant speed motor can be used, the size recommended being from 3 to 5 hp.

The swing over the bed is $19\frac{1}{2}$ in., over the carriage $13\frac{1}{4}$ in., over the compound rest $11\frac{1}{2}$ in., and over the taper attachment $10\frac{3}{4}$ in. The front journal is $3\frac{1}{4}$ in.



Coneless Engine Lathe. Twelve main spindle speeds are provided, which are selective. End view to right shows mounting of the motor



on the headstock shows the level of the oil, which should be normally about half full.

The main spindle is a chrome-nickel steel hammered forging, heat-treated. All spindles have large collars forged integral with them, affording a large diameter for seating face and chuck plates. All shafts in the headstock, back-gear shafts, initial driving shaft and intermediate shaft are of alloy steel, heat-treated and the keys or feathers required are milled integral with the shaft. All bearings, including the main spindle bearings, are of phosphor bronze.

Twelve main spindle speeds are provided, and are selective. Thirteen gears are used. Clutches and

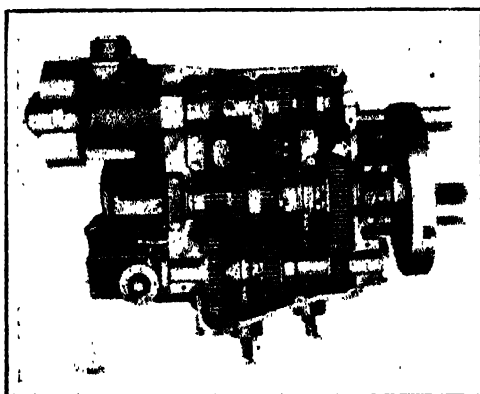
in diameter, $5\frac{1}{2}$ in. long; and the rear journal $2\frac{1}{4}$ by $3\frac{1}{16}$ in. The spindle nose is 3 in. in diameter and has 6 threads per in. The hole in the spindle is $1\frac{1}{2}$ in. The tailstock spindle is $2\frac{1}{16}$ in. in diameter and has a travel of 9 in.

The lathe cuts 2 to 56 threads per in. and the feeds per in. are $\frac{1}{4}$ to 224. The lead screw threads are four per in. and the distance between centers on a coneless lathe with 8 ft. bed is 4 ft. 2 in. The floor space occupied is 10 ft. by 3 ft., and 10 ft. by 3 ft. 7 in. for the motor driven lathe. The weight of coneless lathe with 8 ft. bed is 4269 lb.

Will Rehabilitate Seaboard Equipment

The Seaboard Bay Line Co. has been organized by the Seaboard Air Line Railway Co. and the Baltimore Steam Packet Co., to purchase, rebuild, or otherwise provide for the reconstruction of their cars and equipment. The company will have \$1,500,000 capital to pay in. S. Davies Warfield, president of the Seaboard Air Line, said that 5000 freight cars, or over 30 per cent of the road's rolling stock, were returned from Federal control unfit for service, with the result that the road's actual payment of daily charges for the use of the cars of other roads rose to \$1,500,000. He said that the company's locomotives when returned needed repairs costing \$500,000.

"The Seaboard Air Lines will issue and has arranged to place \$4,600,000 6 per cent 15-year equipment trust certificates at par," said Mr. Warfield. "The proceeds, with other resources of the new company, will pay for 3000 of the 5000 damaged or bad-order freight cars to be immediately reconstructed by the Chickasaw Car & Shipbuilding Co., Birmingham, Ala.; also 1750 new steel underframe freight cars, 25 Mikado locomotives nearing completion by the American Locomotive Co., and two twin-screw steel, combination passenger and freight steamers ordered from Pusey & Jones Co., Wilmington, Del., for use between Baltimore, Md., and Norfolk Va.



Headstock with Cover Removed Showing Arrangement of Shafts, Clutches, Gears and Levers for Speed Changing

clutch gears are hardened and oil tempered and gears always in mesh run in a bath of oil. Positive clutches are provided for speed changing, which is effected instantly and without an interference device. Conflicting gear ratios cannot be engaged. The driving pulley is 13 in. x 4 in., for a $3\frac{1}{2}$ in. double belt and is designed to run at 350 r.p.m. giving spindle speeds of 350 r.p.m. to 9 r.p.m., maximum and minimum. The lever for starting, stopping and reversing the lathe spindle is located at the right-hand end of the apron an auxiliary lever for this purpose being located on the headstock.

• The Southbridge Foundry Co., Worcester St., Southbridge, Mass., is operating its new one-story, 100 x 50 ft. plant. Frank S. Mills is president and general manager, and Alfred A. Allard, treasurer.

Oslund Continuous Wire Drawing Machine

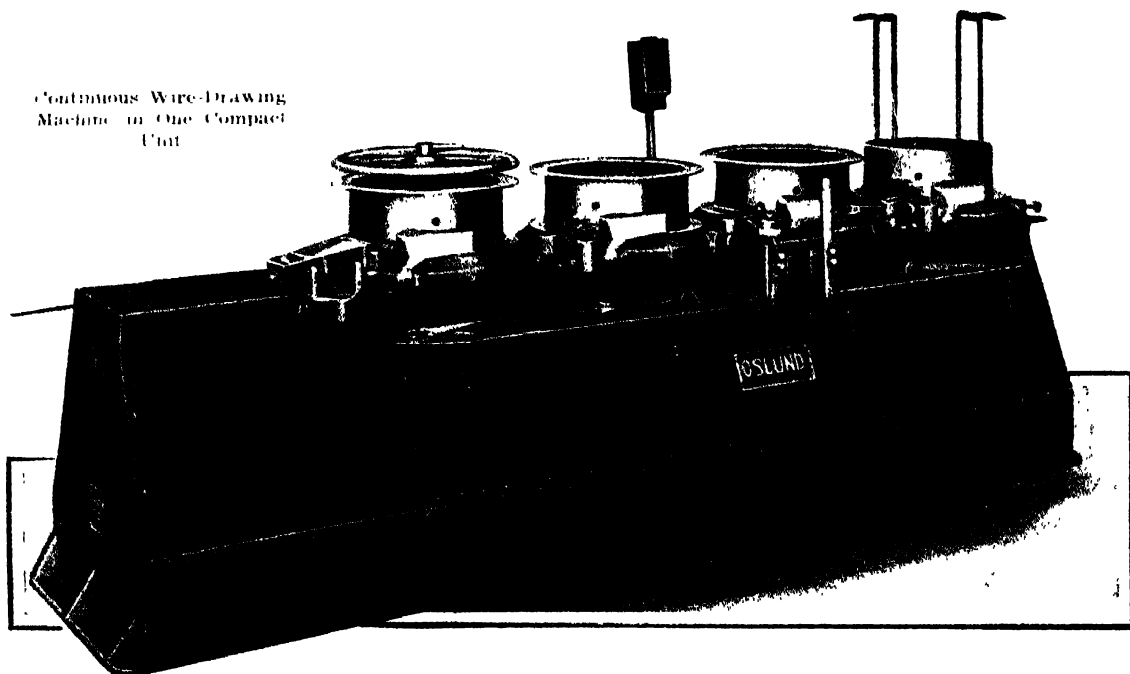
Design Embodies Unique Arrangement of Differential Gearing to Maintain Wire Automatically Taut—Novel Pointing Device and Slow Starting Features

A MACHINE for continuous wire drawing has been brought out by the O. & J. Machine Co., Worcester, Mass. Several new features have been incorporated which differentiate it from previous attempts to effect the continuous process. The machine has four blocks, operating as a continuous unit and permitting the drawing of wire, in the one machine, down to one-half its entering diameter. An electric resistance pointing device provides a smooth conoidal point on the wire, in a fraction of the time usually consumed in pointing. Any one of the four blocks may be slowed down when, for any reason, this is desirable—as, for instance, when starting the wire upon the block. A spring

to one, makes it easy for one man to lift off the coil, swing it around, and deposit it on a truck, or on skids.

In the photograph of the assembled machine, the driving motor is in the closed compartment at the left, the gearing in the long closed compartment at the right. All four blocks and the motor are mounted upon the same cast-iron base plate, thus preserving alinement throughout. The pointing device, located just above the name plate, is convenient to all four blocks. But it usually suffices to point the wire twice, for, with care, the same pointing may be used twice. The hand wheel shown on the first (left) block permits such control of the speed, under power, that the beginning of the draw

Continuous Wire-Drawing Machine in One Compact Unit



shock absorber on each die holder takes care of the jerks due to unevenness of the entering wire or rod. The machine was designed by Charles H. Oslund, president of the O. & J. Company.

Three sizes of the machine are built, one being a rod machine, drawing down from No. 5 wire rod (0.207 in. in diameter) to 0.080 in. diameter, on four blocks. This may be considered as a roughing unit, its product being delivered, after annealing, to either one of the two finishing machines. The machine illustrated, with four drums, will draw 0.080 in. wire down to 0.041 in. The six drum machine will draw 0.080 in. wire down to 0.034 in., or other desired size.

While the machine shown has four blocks, the design is not confined to that number—two, three, five or six may be used, according to necessity. But the point here is that the process is a continuous one. And the machine may be used with any one or any group of the blocks at work, thus providing a maximum of flexibility.

This continuous operation saves much labor. Instead of having to handle each coil of wire twice for each block, as in the usual practice, it is now handled twice for each machine—each four blocks, in the general run of operation—thus requiring only one-fourth the manual lifting of other practice. For the big machine, using 220-lb. coils, a special lifting device on the fourth block, with operating gears in ratio of five

may be made slowly, thus saving the wire from undue stresses and the mill from many broken wires and much delay.

Driving is by electric motor, individual to each machine. This permits the operator to run each machine (one operator can handle four of these machines) at the speed best suited to the wire being drawn. Ventilation of the motor is provided by the screened "windows" shown at the end of the casing. For the smaller machine, drawing wire of 0.080 to 0.099 in. diameter down to 0.040 in. or so, a 5-hp. motor suffices. This may be compared with the estimate of 10 hp. for single blocks of previous types, and with perhaps 30-hp. average for four blocks. Thus the saving in power bills corresponds to that in labor of handling the coils. This low power consumption is due, it is explained, to the bearings and gearing used.

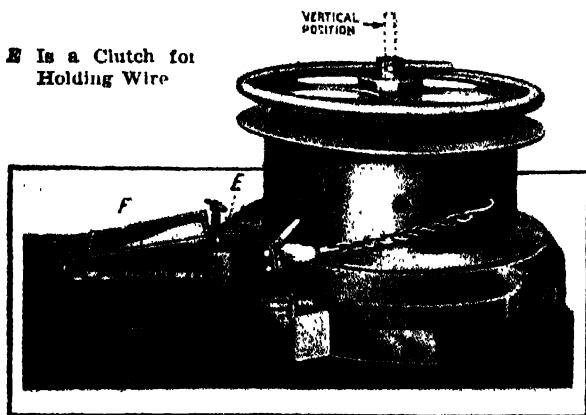
Differential drive gearing leading from the main driving shaft (geared down from the motor speed) is unique in design, and forms a novel arrangement for this purpose. It leads to the bevel gears which, finally, drive the individual blocks. The differential feature automatically compensates for the varying elongation as the wire is drawn through the successive dies, and at the same time automatically allows for the gradual wearing of the dies themselves. This is the outstanding feature of the entire design.

All driving gears are made of phosphor bronze.

The differential gears, of steel, hardened and heat treated, are of standard automobile design. In place of the usual long sleeve bearings, ball bearings are fitted throughout, not only on the main driving shaft from the motor, but on the jack shaft, the differential shafts and the ultimate spindles of the drums themselves. All bearings, gears and differentials run in an oil bath under dust-proof covers.

For providing a point to enter the die, the entering end of the wire, 8 or 9 in. long, is inserted tightly in

E Is a Clutch for Holding Wire

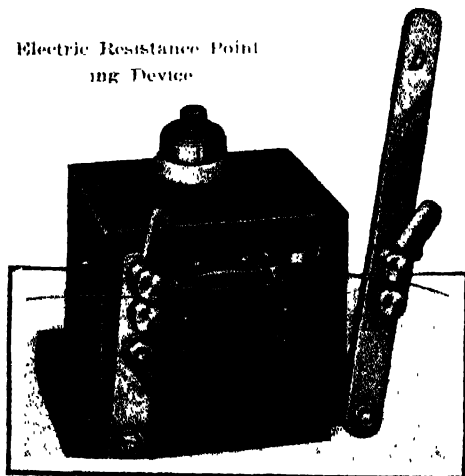


After Pointing, Wire Is Started on the Drum by the Chain Clutch, as Shown. The Die Block Has Spring Shock Absorber, F

the two contact terminals (A and B) on the pointing device, and held by tightening the clamp C, at left. Turning on the current heats the wire cherry red, when a steady pull on clamp D, at right, stretches it and breaks it with a conoidal point, as shown. This point is so smooth and free from burrs that insertion in the die is easy.

To enter the wire upon the first drum, it is caught by a grip as shown in the detail view, and carried slowly around the drum by power, the speed being under rigid control from the operator's hand on the wheel above. After seven or eight turns have been made, the machine is stopped and the leading end of the wire caught in the clip E, leaving enough free end

Electric Resistance Pointing Device



to start on the next drum. This next drum, in pulling the wire taut, pulls it from clip E, and the wire thus passes from the one drum directly to the next. This process is repeated, with intermediate re-pointing as necessary, until all four drums are operating, when the power is allowed to carry the work on continuously.

In the same detail view will be seen the spring shock absorber F, which saves the wire from danger of breaking and saves the dies from the jerks due to unevenness in the entering stock. This eliminates all spotty and cuppy wire. In operation, this take-up

motion is in almost continual and very rapid action.

As the drums are of 16-in. diameter (50 in. or more circumference) and the fourth drum rotates at about 135 r.p.m., the speed of wire through the fourth die is about 550 ft. per min. This is a great increase over the usual finishing speed, and makes for heavy production per machine.

Effect of Sulphur in Rivet Steel

Tests to determine the effect of sulphur on rivet steel made at Watertown Arsenal and the U. S. Naval Experiment Station under the direction of the joint committee on investigation of effect of phosphorus and sulphur in steel of the American Society for Testing Materials have been entirely completed. Bars, flats and finished rivets from fourteen heats of open-hearth steel, carbon 0.09-0.16 per cent, varying in sulphur from 0.03 to 0.08 per cent, with one heat as high as 0.18, were tested in the natural condition "as received," in annealed condition and in quenched conditions. Publication of complete test data will be made through a technologic paper of the U. S. Bureau of Standards. In the meantime an abstract report of the tests will be released for publication by the society about March 1.

Information on Reclamation of Steel Sand

J. C. Davis, fourth vice-president American Steel Foundries, has generously placed at the disposal of the committee on molding sand research of the American Foundrymen's Association the information which has been collected by this company through years of investigation on the subject of cleaning and reclamation of molding sand. Because of the great amount of silica sand used and the scarcity of sand of the best properties, this company has been very active in developing equipment to clean the old sand accumulating in its steel foundries.

Reduction in Rates on Scrap Iron from Texas

The rates on scrap iron from Texas common points and Dallas group have been reduced 20 per cent to interstate destinations. The new rates, per 100 lb., are as follows:

To St. Louis territory	\$0.32 1/2
Chicago territory	0.40 1/2
Kansas City territory	0.32 1/2
Milwaukee territory	0.40 1/2
Memphis territory	0.26

The request for reduction in rates from Texas was presented to the carriers by the Association of Waste Material Dealers, Inc., early in 1921 and was disapproved. It was again docketed by the carriers last September, and the carriers reversed their previous position.

Sharp Reduction on Tractors

CHICAGO, Feb. 3.—The International Harvester Co. to-day announced price reductions of \$230 on two-plow tractors and \$200 on three-plow tractors, effective immediately. Until May 1, next, the company will present to every farmer purchasing one of these tractors a two-furrow or three-furrow plow or a tractor disk harrow. President Harold F. McCormick said: "This reduction is not justified by any present or prospective reduction of manufacturing costs. It is made chiefly to meet competition and enable our dealers to retain their position in the tractor trade. The burden of this reduction and the cost of the plows or harrows presented to purchasers will be borne entirely by the company."

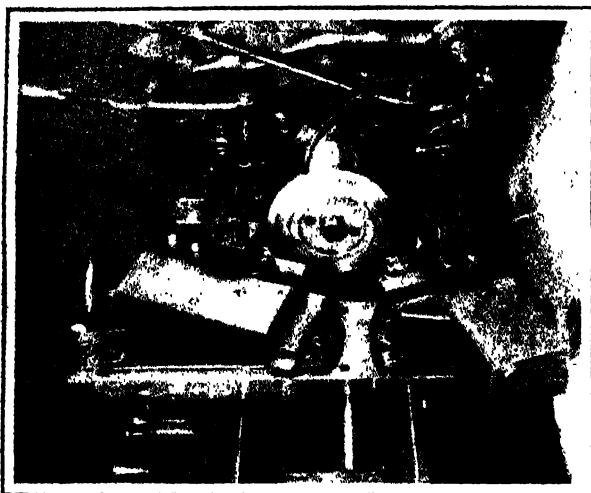
Consolidation of Chicago Jobbing Foundries

Negotiations are under way which may lead to the consolidation of six or eight Chicago jobbing foundries. Although the parties interested failed to come to an agreement on one merger plan submitted to them, negotiations were resumed with the probability that the consolidation will either be consummated or dropped within the next month.

Bevel Gear Attachment for Turret Lathe

The rapid reduction of forged bevel gear blanks has been a troublesome matter to the automotive industry because of the special steels used in this part of the automotive mechanisms. After considerable preliminary work the Warner & Swasey Co., Cleveland, has brought out an attachment on which a patent has been applied for, for use on its No. 3-A universal hollow hexagon turret lathe which, it is claimed, will materially reduce bevel gear costs. The attachment interchanges with the top slide of the regular carriage so that the machine may be used part time on other work or all the time on bevel gears alone.

The attachment is shown in the accompanying illustration. It is heavily and rigidly constructed to enable maximum cuts to be taken to the capacity of the cutter strength. It is universal for all standard angles



up to its maximum work capacity of 14 in. diameter. The operation of the attachment is as follows: Two tool slides are operated by the hexagon turret and saddle. Rack A, which is mounted to the hexagon turret, engages double pinion B. When the turret is moved toward the head of the machine, rack A revolves pinion B in the direction shown. Pinion B engages rack C and transmits to it a sliding motion toward the rear of the machine and rotates two double pinions D which engage with racks E, fastened to the tool slides. The front slide operates on one side of the gear, the rear slide on the other, and both operate at the same time.

The makers believe that many automotive shops, gear manufacturers and others can operate a No. 3-A universal hollow hexagon turret lathe with this attachment either part or full time very profitably.

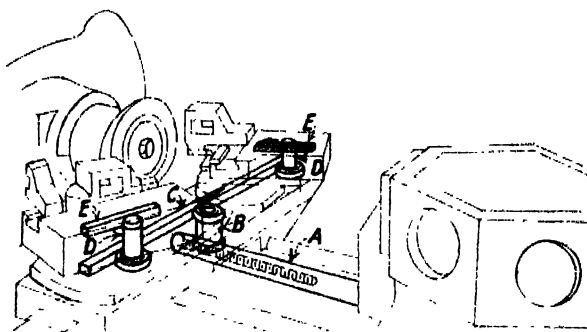
Cost of Producing Chinese Pig Iron in 1919

The Hanyang Iron and Steel Works, Hanyang, China, draw their iron ore from their own mines at Tayeh. The cost of production at Tayeh in 1919 according to the London *Ironmonger* was below \$2.80 per ton, but the transportation to Hanyang cost \$0.85, which, together with other expenses, brought the cost up to about \$4 per ton at the furnaces. This cost has since been lowered by smelting the ore at Tayeh but an allowance must be made for the coke which has to be taken to Tayeh. As nearly equal quantities of coke and of ore are used in the furnaces, the saving effected in transportation is not of much significance. Limestone also comes mainly from Tayeh. The cost per ton at the Hanyang furnaces varied in 1919 between \$2.32 and \$3.81. These figures include all transportation and overhead charges. Manganese comes from the company's mines at Changlai and Yangshin. These two items amounted in 1919 to 3 or 4 per cent of the total cost. The laborers are divided into foremen, mechanics, regular laborers, and helpers who are paid by the day. The wages of some foremen are as high as \$100 a month, the mechanics receive about \$20, the

regular laborers from 8500 to 9000 cash per month, and the helpers 200 cash a day. The total cost in direct labor is from 0.8 to 1.4 per cent of the cost of iron production.

German Foreign Trade Recovering

WASHINGTON, Feb. 7.—Whether or not expansion of German foreign trade is to continue without interruption is to be determined by the future, but that it is making a recovery is evidenced from a report received by the Department of Commerce from Commercial Adviser Herring, Berlin, who points out that German foreign trade figures for December showed the first favorable balance recorded for 1921. In November a decrease was noted in the prevailing adverse balance, imports being valued at 12,278,000,000 paper marks and exports at 11,912,000,000, but December



Attachment in Use on a Turret Lathe Is Shown at Left. Phantom view above shows component parts

showed an actual favorable balance in paper marks of 900,000,000. The December imports amounted to 2,090,000 metric tons, valued at 13,700,000,000 paper marks, and exports amounted to 1,930,000 metric tons, valued at 14,600,000,000 paper marks. Although the trade balance by volume is slightly unfavorable, the values show the favorable balance indicated.

Compromise with Molders

The Cincinnati local of the International Molders' Union, in conference with the union foundry employers of Cincinnati, reached a compromise in the matter of wages to be paid in the future. The employers had recently reduced the pay of the union workmen to \$5 a day, whereupon the molders quit work. They had been receiving \$6 for eight hours work and in the compromise a wage of \$5.50 will be the scale in the future. A plan to prevent strikes in the foundry industry is now being worked out and is expected to be in operation within the next 30 days. Union shops are taking on a few men, but general conditions are such that only about 200 molders are now employed in the city. As a result of the strike, two large union shops have now declared for the open shop and will in the future be run on that basis.

Radio Telephones Popular

SEATTLE, Feb. 1.—The Pacific Northwest has become infatuated with the radio telephone idea, and with one of the daily newspapers equipped with a sending apparatus of five watts, 5000 receiving instruments have been brought within reach of the nightly concerts and news bulletins, and the number is increasing rapidly. The demand for the magavox, vacuum tubes, copper wire and other essentials has kept the radio companies stripped, and during the past 60 days fully 50 per cent of these units have been out of stock. There are many amateur sets, but equipment running up to \$250 and \$800 is being installed in many public places and homes.

Secretary Hoover Speaks for the Public

Addresses the Interstate Commerce Commission, Favoring Reduction of Freight Rates on Raw Materials— Shows Progress of Deflation

BY L. W. MOFFETT

WASHINGTON, Feb. 7.—Reduction in freight rates on coal, metals, wood, and agricultural and other producer's goods to the bottom before less-than-carload and class rates are touched, was advocated by Secretary of Commerce Herbert Hoover, when he appeared before the Interstate Commerce Commission last Friday afternoon, for the Chamber of Commerce of the United States, as a witness for the public. The Secretary of Commerce expressed opposition to a general reduction in rates and declared that an economic analysis of the country's industry will show that less-than-carload and class rates are far too low compared to rates on primary commodities. His suggestion, if adopted, would mean a great relief to the iron and steel industry.

"With the gradual return of the traffic to normal, with decreased operating costs, relief in rates will be available, and it would be an economic crime to apply such relief by horizontal reductions to all rates thus giving relief to higher priced goods and travel, when the vital parts of our economic life, our agriculture and fuel and metals, are choked," Mr. Hoover declared.

In approaching the question of readjustment of railroad rates, Secretary Hoover submitted a table in which he compared present prices of commodities and wages paid in various industries in 1913, which were given the index number of 100. This table showed a marked deflation in iron and steel and non-ferrous and agricultural lines and the maintenance of inflated prices in other lines, particularly in the retail trade. Some of the price index numbers were as follows: Steel billers, Pittsburgh, 113; copper 68, the lowest of all; zinc, 90; pig iron, Pittsburgh, 128; bituminous coal at mine, 160; bituminous coal retailer, 198-220; retail clothing, the highest of all, 213; farm crops at the farm, 98, and all animals at the farm, 92.

Approximates of wage scale index numbers included steel industries, 150; metal trades, 218, the highest in the list; building trades, 190; railroads, 200; coal mining scales, 183 and farm labor, 135.

Inequalities Shown

This table was cited to demonstrate the inequality in prices and wages between different groups of commodities, the great increase in spread between "producer's and consumer's goods and the lag in wage scales." It was pointed out that as the population engaged in the "deflated" producer's goods—agriculture, and metals, wood, etc.—comprises one-half the total in number of the nation, their power to buy the same ratio of consumer's goods has been reduced to less than 70 per cent of pre-war, and is the consequent cause of a large part of the industrial and commercial unemployment and stagnation in our cities and our transportation.

It was declared by Secretary Hoover that the violence of the country's readjustment is without parallel and that it is necessary to predicate all plans for the future on the ultimate return of the American people to a normal economic activity with annual progress in the expansion of production of plant and equipment, of skill and efficiency. He insisted that there can be no question that this return will take place, and that no responsible body will approach the problems on any other basis.

"The greatest impulse that can be given to recovery from any source whatever is a reduction of rates on primary commodities combined with the immediate resumption of railway construction and equipment," Mr. Hoover said. "The first depends upon reduction of

operating costs, the second upon restoration of credits for our railways."

Mr. Hoover continued:

One thing is absolute. Our transportation facilities are below the needs of our country, and unless we have a quick resumption of construction, the whole community—agricultural, commercial and industrial—will be gasping from a strangulation caused by insufficient transportation the moment that our business activities resume. For the past five years, we have had no consequential expansion to our railway transportation machine. With but one interval of 9 months in 1918 and 1919 we had a car shortage throughout the whole of the years 1916-17 18-19 and 20. This shortage rose to as high as 160,000 cars with a corresponding shortage of motive power. We paid tremendous sums in commercial losses and unemployment in consequence. We laid it onto the war. We should lay it onto our lack of foresight and antagonism to railroads.

Needs of Railroads

Mr. Hoover said that experience of the 20 years before the war has shown that it is necessary to build an extension of lines, including terminal facilities, additional sidings, etc., every year equal to the construction of a new railroad from New York to San Francisco. He said it will be necessary to add at least 120,000 cars and 2500 locomotives annually to equipment, and that since the United States entered the war in 1917, the country has constructed at least 10,000 miles of railways less than the increasing population and economic development called for and that the nation is behind in rolling stock by about 4000 locomotives and 200,000 cars. He emphasized the fact that unless there is an immediate resumption of construction and equipment, the community will pay treble the cost of the whole of them in their losses of a single season.

The Secretary of Commerce said that there is nothing so irrecoverable a loss to the United States as idle shops and idle men, both of which, it was stated, exist to-day. At the same time, he asserted that there is nothing that will so quickly start the springs of business and employment as an immediate resumption of construction and equipment of the railroads.

When Business Resumes

"When business does resume," the Secretary pointed out, "we shall need all of our capacity for the production of consumable goods. We shall not only find it strangled for lack of transportation, but we shall find ourselves plunging into the manufacture of this very railway equipment and construction in competition with consumable goods for materials and labor. Herein lies the basic cause of destructive price inflation and booms, with all their waste and over-expansion. In times of depression we should prepare for the future and by doing so we can cure the depression itself."

Turning to the fundamental reason for failure to resume equipment, the Secretary assigned the cause to the loss of confidence in railroads as an investment, and the competition of tax-free securities. In this connection, he urged government guarantee of equipment trust certificates of the railroads, accompanied by "a courageous program of broad-visioned betterment." Mr. Hoover said this program would not cost the taxpayers a cent or result in loss to the Government. He maintained that by providing the carriers with a means of obtaining money to prepare adequate transportation facilities large savings would result in the end.

The Present Situation

Dealing with the present rate situation, Secretary Hoover said that the last five years of changing administration, irregular traffic and widely fluctuating wages and prices of materials give but little reliable historical criteria upon which to base the future. He said

that the country is in the midst of violent economic readjustments, of a profound industrial depression, and that the Commission, therefore, will need to temporize with the situation for some time. Its conclusions, he asserted, may well fall into three periods: first, the immediate present; second, during the early period of decreasing costs and increasing efficiency and slowly recovering traffic; and, third, normal operations.

Discussing the immediate present, the Secretary pointed out the financial condition of different groups of railroads and said that he believes there are cases where earnings could be increased by lowering rates and asserted that no one can review the testimony given before the commission during the past few weeks without concluding that the rates in special instances are stifling business. These directions are perhaps not important in the whole problem of rates, the Secretary said, but that he was convinced that lower rates would recover lost traffic, such as export coal, substitutions in building materials, gains in water competition, etc.

Taking up the second period during 1922, Secretary Hoover said that he had the feeling that the railroads will agree that all these savings should be instantly devoted to relief in the rates on primary commodities in order to expedite the recovery that can only come through a decreased spread between producer's and consumer's goods. He said that he recognized that the uncertainty and slow reduction of rates in this fashion will itself delay business recovery because of the un-

certainty of business as to its future costs. It was declared that if the railroads were in position to stand the temporary shock it would be infinitely better to drop the rates on primary commodities to-morrow, and that business recovery would come faster. He added, however, that "we cannot ask the impossible."

Looking to Normal Times

As to the third question, Secretary Hoover said that looking further to normal times, a rough calculation that present wages and costs at, say 50 per cent above pre-war, would show that the railways can earn somewhere around \$1,500,000,000 in excess of the 6 per cent minimum upon tentative valuation.

"As I have stated," said Mr. Hoover, "relief is first most critically needed in the rates on primary commodities."

"Some estimates given to me," continued the Secretary, "indicate that approximately 35 to 40 per cent of revenues are involved in the groups more urgently needing relief. I think it will also bear calculation that in the income assumed above that primary commodities can eventually be reduced to prewar rates, and still place earnings upon a basis that will inspire such confidence in investors as will secure free flow of investment capital into construction. It is not to be expected that capital for these purposes will be available at the rate that does not exceed the tax-free securities at least 2 per cent to 3 per cent."

CENSUS FACTS NEEDED

House Committee Refuses to Make Appropriation for Publication

WASHINGTON, Feb. 7.—While for probably the first time in the history of the Bureau of the Census blanks for the census of 1921 have been prepared in almost the exact form desired by the various industries of the country to produce the facts wanted, their purpose largely will be defeated, it is maintained, unless the House Committee of Appropriations is persuaded to change its course. The committee has refused to make an appropriation to tabulate the returns and publish the results. The consequence would be that the facts would be unavailable to the industries.

By reason of this situation, the National Association of Manufacturers has addressed a letter to secretaries of trade associations urging them to get behind a movement to see that the necessary appropriation, amounting to only \$986,440, is made. The subcommittee of the House Committee on Appropriations having the matter in charge is composed of Representatives Milton W. Shreve, Pennsylvania (chairman); Elijah C. Hutchinson, New Jersey; Charles F. Ogden, Kentucky; William B. Oliver, Alabama, and Anthony J. Griffin, New Jersey.

The letter from the National Association of Manufacturers points out that under the act of March 3, 1919, provision was made for taking the census of manufactures for the years 1921, 1923, 1925 and 1927, and every tenth year after each year named, instead of every five years, as heretofore, and after stating that blanks prepared are in accordance with wishes of industries of the country, tells of the action of the House Committee on Appropriations in refusing to appropriate the necessary money to make the facts available.

"It is well known that the census of manufactures for the year 1919, taken in the year 1920, was under inflated conditions and this census of 1921 is doubly necessary in order that industry may be accurately informed," says the letter. "It is vitally necessary to the industries of the country that production statistics, currently gathered, may be promptly available. In these times the business man who does not have all the available facts is in the position of the farmer with a thermometer but no calendar or almanac."

President Edgerton's Letter

Interest of industries of the country in the Department of Commerce, particularly the Bureaus of Stand-

ards, Census and Foreign and Domestic Commerce, and the desire that they be supplied with adequate funds, is pointed out by President John E. Edgerton of the National Association of Manufacturers in a letter to Secretary Hoover. Mr. Edgerton states that the manufacturers, "while strong for all proper provisions of economy in governmental expenditures, are extremely desirous that most careful consideration be given to constructive proposals which may tend to repair the damage done to our economic and industrial structure by the serious years through which we have lately passed," and declares that the Secretary's estimates of necessary expenditures for the Department of Commerce for 1923 "appear to be most modest and have our hearty support. I observe with distinct appreciation that you are directing the activities of your department to those lines of work most essential. I am astonished at the fact that the proposed appropriation for your department is only one-half of 1 per cent of the total amount requested by all executive departments for 1922-1923." The Secretary's estimate was approximately \$23,000,000 and this was cut down about 16 per cent or to about \$19,400,000 by the Bureau of the Budget.

"This is all the more striking," says Mr. Edgerton in commenting on the relatively small estimates of Mr. Hoover, "when it is remembered that the manufacturing industries of the country, in 1918, paid 67 per cent of all of the income and profits taxes collected by the Federal Government and that they paid into the Federal treasury approximately 45 per cent of their total net receipts."

Speaking especially of the work of the three bureaus mentioned, Mr. Edgerton says the service done to industry by the Bureau of Standards could not be duplicated and that if its work could be figured in dollars and cents, the benefits to the community from its service would run into many millions. With regard to the Bureau of Census, Mr. Edgerton says its work in the past interested him only slightly, "but is now headed in a new direction and is beginning to compile statistical information that is not only interesting to the general public but extremely useful to the business community. Someone should have thought of this use of census machinery before."

The statement in THE IRON AGE, Jan. 12, that the electric furnace of the electro-metals type in Ireland's first electric steel foundry was the same type as the Greaves-Etchells in the United States was an error. The two types are distinct and the latter is an active competitor with the former in Great Britain.

Pittsburgh Base Called Controlling Factor

Hearing Before Federal Trade Commission Continues at Milwaukee, Manufacturers Claiming Adding of Freight Is Unjust

MILWAUKEE, Feb. 6.—Samuel H. Squier, president Milwaukee Electric Crane & Mfg. Co., testifying Monday at the resumption of the hearing on the Pittsburgh basing point practice before the Federal Trade Commission, expressed the belief that price difference brought about by this practice is a controlling factor in the rolled steel business now and in more normal times is an important factor. He said the practice created conditions of unequal competition when his shop bid for work against shops located nearer Pittsburgh, inasmuch as his concern had to pay a freight rate of 41.5c. per 100 lb. from Pittsburgh to Milwaukee, placing it at a disadvantage over competitors paying lesser freight charges due to advantageous geographical location. Citing the case of a competitor located in Alliance, Ohio, to which point the freight rate is 12.5c. from Pittsburgh, Mr. Squier said that, assuming both bought steel for the same price and paid freight from Pittsburgh, the Alliance shop could lay down its product almost anywhere in the United States at a price advantage excepting only in Milwaukee, where the Alliance concern would be at a disadvantage of 10c. per 100 lb. In Chicago the Alliance concern, Mr. Squier testified, would have a price advantage of 14c. per 100 lb., other conditions being equal. At St. Louis the Alliance shop would have an advantage of 22c., Duluth 14.5c., Minneapolis 9.5c., Seattle and San Francisco 12.5c., Kansas City 0.5c. per 100 lb. Mr. Squier said a typical crane made by his concern sold for \$6,500, representing an average profit of 15 to 20 per cent, but about \$125 of otherwise legitimate profit usually had to be sacrificed because of unearned freight charges imposed by the Pittsburgh basing point.

Mr. Dieckelman Testifies

R. P. Dieckelman, secretary Pressed Steel Tank Co., West Allis, the only other witness called Monday, did not complete his testimony owing to lack of time. He testified that his concern consumes 18,000 tons of sheets and plates annually in manufacturing standard and patented steel tanks, drums, barrels, etc. Business in the standard line was restricted principally to Western territory because of disadvantages imposed by the Pittsburgh basing point in competing in territory East of Chicago. On patented articles, however, the disadvantage obviously was not so great, he said, because selling prices were not controlled so closely as on standard products, which are in open competition. Mr. Dieckelman said that, assuming his concern's competitors at Sharon, Warren or Niles bought material at Pittsburgh plus as he did, and all other conditions were equal, the fact that these shops pay a freight rate of only 10.5c. per 100 lb. from Pittsburgh, provided them with an obvious advantage in selling standard articles in competition with the Milwaukee shop paying 41.5c. Pittsburgh to Milwaukee, plus the freight on the finished goods, when back routed.

Cross examined by counsel for the Steel Corporation, Mr. Dieckelman said that, roughly speaking, his company's business was divided into 50 per cent patented and 40 per cent standard products over a five year period just past. In a previous five year period, patented articles represented 75 per cent and standard 25 per cent of the total sales. War requirements, he testified, had an important bearing on the change in the nature of production, more standard articles having been made in the more recent five-year period. In the Eastern territory, he said, only the patented articles were salable in competition with Eastern manufacturers, and represent about 20 per cent of the business

in patented products was being done in territory East of Chicago.

Progress Made Slowly

At the close of the first week's sessions of the hearing conducted at Milwaukee by the Federal Trade Commission on its complaint seeking the abolition of the Pittsburgh basing point practice at the instance of Western rolled steel consumers, only a small percentage of witnesses offered by the consumers had been heard. Progress of the hearing has been slow due to the desire of both parties to the action to delve as deeply as possible into fundamentals, which process involved many instances of intimate inquiry respecting volume of materials consumed, prices paid, profits or losses established, and similar details.

The general tendency on the part of witnesses to indulge in speculative statements regarding the alleged discriminatory effect of buying steel f.o.b. Pittsburgh, regardless of the point from which the material was actually shipped, was sharply opposed by counsel for the respondents, the United States Steel Corporation and subsidiary companies. Efforts of counsel for the Federal Trade Commission to induce witnesses to tell of discriminatory effect when based on facts and figures generally were permitted.

At one time, when Frank R. Nanscawen, service manager of the Heil Co., Milwaukee, was on the stand and contended that the abolition of the Pittsburgh basing point would enable manufacturers in Milwaukee to compete on equal terms with Eastern fabricators, while under existing conditions the adverse effect is sufficient to keep Western manufacturers from competing in territory more geographically favored, counsel for the respondent engaged in a legal controversy with counsel for the commission which was settled when Commissioner Houston Thompson, presiding at the hearing, questioned the witness: "If it were not for the alleged additional price necessary through the operation of the Pittsburgh basing point plan, could you compete in the Pittsburgh market?" The witness answered, "Yes." A motion that all of Mr. Nanscawen's testimony be stricken from the record was denied by Commissioner Thompson.

How the Cost Is Increased

A. G. Henricks, vice president and general manager Pawling & Harnischfeger Co., Milwaukee, in his testimony asserted that the additional cost of material due to payment of freight rates from Pittsburgh to Milwaukee which were not actually paid by the manufacturers, caused the cost of the finished product to be increased, making Milwaukee fabricators unable to compete in Eastern markets with Eastern concerns excepting at a sacrifice of profits. He said that on Oct. 26 the Pawling & Harnischfeger Co. bid on a job for the National Radiator Co., making a price of \$3950. The Cleveland Crane & Engineering Co. entered a bid of \$3,900. Mr. Henricks asserted that his company was required to pay approximately \$60 in freight charges from Pittsburgh to Milwaukee on the material entering into the product, although the material was derived from the Gary or Milwaukee mills of the Illinois Steel Co. This requirement enabled the competitor to underbid.

Julius P. Heil, vice president of the Heil Co., who was recalled to analyze invoices and contracts introduced in evidence during his original appearance on the stand, testified that while these showed that material was purchased f.o.b. Milwaukee, all prices represented a base price f.o.b. Pittsburgh, with freight from Pittsburgh to Milwaukee added. Most of the invoices covered material shipped from the Chicago district

while in several instances the material was hauled from the Milwaukee mill of the Illinois Steel Co. by the Heil Co.'s own trucks to the Heil plant in Milwaukee.

Invoices Presented

C. J. Heil, purchasing agent of the Heil Co., presented invoices covering purchases of rolled steel from so-called independent producers located in Chicago, Cleveland, Indiana Harbor and Buffalo, all of which were based on Pittsburgh plus. Counsel for the Steel Corporation objected to admitting this evidence into the record because the concerns involved are not named in the present case. Commissioner Thompson, however, overruled the objection after K. E. Steinhauer, counsel for the commission, explained that he proposed to show that the Pittsburgh plus system was a general practice which tended to lessen competition.

H. C. Banks, of the Interstate Drop Forge Co., Milwaukee, testified that, assuming the labor and overhead costs of a Pittsburgh competitor are the same, his company can only compete with such competitor

for business in Milwaukee by sacrificing part of its profits. He said steel was purchased on a Pittsburgh basing point and there is from 50 to 60 per cent wastage in fabrication. Since the freight rate from Pittsburgh to Milwaukee is the same on finished products as on raw material, a Pittsburgh competitor is able to deliver his products in Milwaukee at a lower price than this Milwaukee concern.

Carl F. Garmy, purchasing agent E. R. Wagner Mfg. Co., North Milwaukee, steel stampings and hardware specialties, testified that in the instance of a certain line of automobile parts his company was compelled to reduce its profit 7 to 8 per cent in order to meet Eastern competition in territory east of Chicago. Counsel for respondent asked if this item was not selected for illustration because it showed a small percentage of profit, which was denied by the witness. Extension of questions into the rate of dividends paid by the Wagner company over a period of years met with the refusal of the witness to answer on the point of personal privilege.

FIGURING BAR STEEL WEIGHTS

Handy Rules for Quick Calculations of Hexagons, Rounds, Squares and Flats

BY W. F. SCHAPIROST, M.E.

When engineers and other users of steel rods and bars want to know the weight of bars of given diameter and length, they want to know quickly. Tables are not always available, and accurate formulas are used with too much difficulty. Here are some quick and surprisingly accurate rules based upon Hyman Levine's formulas:

Rule 1—Hexagon bars: Square the distance (in inches) across flats; divide by 4. The answer is the weight per inch of length.

Rule 2—Round bars: Square the diameter in inches; multiply by 2; divide by 10; add 10 per cent. The answer is the weight per inch of length.

Rule 3—Square bars: Square the distance (in inches) across flats; multiply by 3; divide by 10; subtract 1/20, or 5 per cent. The answer is the weight per inch of length.

Examples

Example 1—Hexagon bar, 100 in. long.
Distance across flats, 2 in.

Applying Rule 1:

$$\begin{aligned} 2 \times 2 &= 4 \\ 4 \div 4 &= 1 \text{ lb. per inch of length.} \\ 1 \times 100 &= 100 \text{ lb., the weight of the hexagon bar.} \end{aligned}$$

Example 2—Round bar, 100 in. long.
Diameter, 3 in.

Applying Rule 2:

$$\begin{aligned} 3 \times 3 &= 9 \\ 9 \times 2 &= 18 \\ 18 \div 10 &= 1.8 \\ \text{Adding 10 per cent,} & \\ 1.8 & \\ 1.8 & \\ \hline 1.98 \text{ lb. per inch of length.} \\ 1.98 \times 100 &= 198 \text{ lb., the weight of the round bar.} \end{aligned}$$

Example 3—Square bar, 100 in. long.

Distance across flats, 1.5 in.

Applying Rule 3:

$$\begin{aligned} 1.5 \times 1.5 &= 2.25 \\ 2.25 \times 3 &= 6.75 \\ 6.75 \div 10 &= 0.675 \\ 1/20 \text{ of } 0.675 &= 0.03375 \\ \text{Subtracting} & \\ 0.675 & \\ \hline 0.64125 \end{aligned}$$

$$\begin{aligned} 0.64125 \text{ lb. per inch of length.} \\ 0.64125 \times 100 &= 64.125 \text{ lb., the weight of the square bar.} \end{aligned}$$

It will be noticed that each of the above operations is very simple—so simple that most of them can be performed mentally—such as multiplying by 2, dividing by 10, dividing by 20, squaring, etc. Also, they are easily remembered. A rule of thumb is not much good unless it is simple and can be remembered.

In case one should forget the above rules, here is an excellent one by Professor Merriman, which the writer has carried around in his head for 16 years: "A bar of steel 1 in. square and 1 yd. long weighs 10 lb." This rule is good because it is easily remembered, and it is easily remembered because it is so simple. Professor Merriman's rule becomes useful at any time as a basis on which to figure round, hexagon or any other kind of steel rod.

Editor's Note: For a flat bar of rectangular cross section, Rule 3 will apply, with this modification: Multiply width by thickness, instead of squaring distance across flats.

Example 4—Flat bar, 100 in. long.

Section 3 x 1/2 in.

Applying Rule 3:

$$\begin{aligned} 3 \times 1/2 &= 1.5 \\ 1.5 \times 3 &= 4.5 \\ 4.5 \div 10 &= 0.45 \\ 1/20 \text{ of } 0.45 &= 0.0225 \end{aligned}$$

$$\text{Difference } 0.4275 \text{ lb. per inch of length.}$$

$$0.4275 \times 100 = 42.75 \text{ lb., the weight of the flat bar.}$$

For more exact results, it may be noted that Rule 1 gives an answer about 2 per cent too high; Rule 2, about 1 per cent too low; Rule 3, about 0.6 per cent too high. Anyone desiring this greater degree of exactness may obtain it by decreasing Rule 1 answers by 2 per cent; increasing Rule 2 answers by 1 per cent; decreasing Rule 3 answers by 0.6 per cent.

Arousing the Farmers

Opposition to Pittsburgh "plus" was urged by James Nicols, president of the State Farm Bureau of Michigan, in a recent address before the beet growers of that State at Saginaw, Mich. The speaker directed the attention of his audience to the hearings on the Pittsburgh basic point practice before the Federal Trade Commission in Milwaukee. For two years the American Farm Bureau Federation has been active in opposition to the Pittsburgh plus practice, on the grounds that it increases the prices which farmers must pay for farm machinery, wire fence, etc.

The Ohio Structural Steel Co., Newton Falls, Ohio, was recently referred to in THE IRON AGE as having established a plant to handle structural steel work of a not too complicated nature. This was incorrect, as the company is fully equipped to handle all kinds of structural steel and has been fabricating bridges, buildings and steel oil derricks for the past three years.

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Variegating the Mills Product

In the years of heavy new construction in the steel industry before the war, a strong tendency was exhibited for the steel mills to variegate their output. The large independent steel companies seemed dissatisfied unless they could feel that they were making progress toward the position of producing a "full line" of steel products. America being a country, and that being an age of specialization, a definite defense for such a policy was needed, and the defense was furnished partly by the plea that sales offices had to be maintained and might as well have a wider variety of goods to sell, and partly on the ground that the relative demand for different products varies from year to year, so that a steadier total volume of business could be maintained by its being possible to put steel into one product or into another.

While there is no particular satisfaction in being engaged in the manufacture of any description of steel these days, it is plain that activity is better distributed among the different steel producers now than would be the case if they had not variegated their output. Rails, shapes, plates and bars have been and are in especially poor demand, but tin plate, pipe, sheets and wire products have been in good demand, relatively speaking. Only two of the really large independent steel companies, however, produce tin plate. Perhaps there are some who regret that, in their desire for "tonnage" products, they overlooked tin plate.

There has always been more or less debate as to the relative merits of the highly specialized mills on the one hand and the more general purpose mills on the other, and thus the question of variegating output has come up in connection with individual mills or trains of rolls. For the highly specialized mill it has been argued that it can make long runs on a size, with correspondingly lower cost, while for the general purpose mill it has been argued that there is more chance for the salesman. A highly specialized case of the general problem is now presented, for there are no orders going these days that furnish long runs. Buyers are ordering material in the hand-to-mouth style, and specifications even for single carload orders usually involve quite a mixture. At the same time the need for pro-

ducing at very low cost is particularly pressing.

An interesting question arises whether, in these days of strenuous search for outlets for steel in finished products, mills will be more disposed than formerly to carry their rolled products into manufactured articles. Already one steel producer or another makes freight cars, cold finished steel bars, well drilling rigs, railroad spikes and forgings, but in general the mills have preferred to let their customers make these things. The great objection to extensions of this description at the present time is that it is difficult to build up trade when there are not enough orders to satisfy the sellers already in the field. There is left to the mill the chance of developing some entirely new product which with its organization it can push to advantage.

Coal Labor Conditions

The general opinion is that there will be a suspension of mining at the union bituminous coal mines April 1, when the present wage agreement expires, and that the chief point at issue will be the check-off. The event may prove otherwise, but this is the common expectation in the trade at present.

Attention is naturally focused on the Pittsburgh district, which in the past has been the pivotal region in bituminous wage matters. A fortnight ago the Pittsburgh operators announced a wage scale which they intend to post at their mines rather than present to the national officials of the United Mine workers. Study of the rates named has led to the conclusion that the miners cannot seriously object on that score. On the basis of the pick mining rate for thin-vein mines, the scale is 31 per cent below the existing scale, which is a very high one, and has lost the union mines most of their trade; it is equal to the scale of April 16, 1917, 19 per cent above the scale obtaining April 1, 1912, to April 1, 1916, and somewhat more than double the rates paid in 1896.

From the present appraisal by the trade, the chief matter in controversy will be the check-off rather than the wage rates. The situation as to the check-off cannot be understood without a review of

the history of this institution, unique as concerns the United States, since it prevails nowhere but in coal mining. The check-off may be said to represent automatic unionism, for when a man becomes an employee of a coal operator who has signed the scale, he becomes thereby a member of the union, since his dues and fines and initiation fee, if any, are deducted from his pay and remitted by the operator to the district organization of the United Mine Workers.

A quarter century ago, the coal industry was full of strife. There were union mines and non-union mines, and in the Pittsburgh district they were almost side by side. The competition was very keen, the non-union mines paying rates which on paper were much below union rates, while the union operators endeavored to save themselves by the profits of their "company stores." The latter were unable to rid themselves of the union or to compete successfully with the non-union operators. From this, apparently, arose the check-off. If there had to be a union, it seemed better that the conditions be the same for all operators.

After more than 20 years of the check-off, however, the bituminous coal industry as a whole is found to be about two-thirds union and one-third non-union, and in the past twelvemonth the non-union mines have been producing the bulk of the coal the country has called for. For more than a year, a number of coal operators have been under indictment for being in a conspiracy with the United Mine Workers, the chief basis of the charge being the payment of the check-off by the operators and the use, at non-union mines, the United Mine Workers are charged with having made of the money thus obtained.

Considering the history of the check-off and the conditions now existing, it seems entirely probable that the operators will be absolutely firm in their stand against continuing the system. While the officials of the United Mine Workers are irreconcilable to any other method of financing their union, the miners themselves are understood to be lukewarm, with not a few definitely opposed to the check-off. As the operators are placing the scale, with its conditions, directly before their employees, it may be that the attitude of the men will prove more important than the attitude of the officials of the union.

Mechanical charging of electric steel furnaces, particularly those of moderate to large capacity, is especially necessary if the electric process is to compete with the open-hearth on any large scale. The description in THE IRON AGE last week of a special 7-ton furnace adapted to mechanical charging reveals the trend in this direction. Most types of electric furnaces, large and small, are not charged mechanically with cold metal, unless by removing the roof, which is rare. While the furnace referred to was made for a special use, the change has long been contemplated and may be said to connote the really large electric steel furnace of 80 to 100 tons capacity. Hot metal charging would, of course, commonly obtain, but in many installations mechanical charging of cold metal would be the only practice. The engineering problems of the large

electric furnace appear to fall under solution fully as fast as the economic or commercial place of the furnace is established.

Secretary Hoover's Address

The first point to be noted in connection with the address of the Secretary of Commerce Hoover before the Interstate Commerce Commission last Friday was that an advocate of the public, regardless of any special interest, was invited to appear before the commission and accepted the invitation. Reams of testimony have been taken in the railroad rate investigation in behalf of the shippers and the railroads. Secretary Hoover spoke for the people in general in not asking any special consideration, but wishing to promote the public welfare and restore prosperity as soon as possible.

After showing the great need for new equipment, including 120,000 cars and 2500 locomotives annually to make up the shortage, Secretary Hoover more than hinted that it might be well for the Government to guarantee equipment trusts, which, he said, was not a proposition to take money from the taxpayer, but to save him from paying treble the amount of his guarantee in profiteering and losses.

The Secretary evidently has little patience with the proposal to give credits to foreign countries; he prefers to give it at home, and one of his most significant sentences was that in which he declared: "I wish to say with all responsibility for the statement, that a billion dollars spent upon American railroads will give more employment to our people, more advance to our industry, more assistance to our farmers, than twice that sum expended outside the frontiers of the United States—and there will be greater security for the investor."

The description of the "veritable witches' cauldron being fed constantly with hates distilled from the misdeeds of railroad promoters in the past, from the conflicts between the railroads and the farmers, between the railroads and their workmen," was most impressive and all will agree with the Secretary that it is time to "call off the witches." Surely nothing is to be gained by raking up the scandals of the past, by criticizing those who managed or mismanaged railroads during the war when such tremendous demands were made.

As to the method of readjusting rates, the Secretary advises the policy of caution. He shows how the tendency, as in the case of the raw products used in the manufacture of pig iron, is to force industries to move toward the raw materials and shows how this tendency is deplorable, but also indicates that there must not be sudden changes. It may even be necessary in some cases to advance rates on less than carload lots of some finished products while the rates on coal, metals, wood, agricultural and other producers' goods should be promptly reduced. The Secretary indicates that in considering the situation, the fact that the present earnings are very close to bond obligations must not be overlooked, and readjustment must now be made with regard

to the immediate present. An early period of decreasing costs and increasing efficiency and slowly recovering volume of traffic will bring us later in 1922 to normal operations. The Secretary points out that great social and economic problems find their solutions slowly and by process of trial and error. This country has committed errors enough and should now be able to act wisely. Certainly, as has been pointed out in these columns and also by Secretary Hoover in his address, prosperity cannot be restored by a horizontal reduction of railroad rates.

At this critical time the people of the country are fortunate in having as able an advocate as the Secretary of Commerce. His address should be of real assistance in solving the rate problem in such a way as to bring the greatest relief.

Progress in Centrifugal Casting

The centrifugal casting of metals and alloys has been making rapid strides. It has now covered the handling of steel, one of the most difficult metals to cast centrifugally. The secret of the solution of the steel problem, discussed elsewhere in this issue, is the use of a very hot revolving mold. This appears to have made easy the production of steel tubing of any thickness. If the expectations of the process are commercially realized, a new product of special properties may be expected.

Besides the centrifugal casting of steel and the notable Delavand cast iron pipe process, which reached commercial proportions in Canada, South America and Europe some time ago, and which has recently been adopted by a leading American pipe maker, there have been other important developments. The casting of brass and copper bands by a centrifugal process was described in these columns last May and the production of cast iron piston rings by a like method is familiar. The centrifugal casting of light and miscellaneous alloys has been in progress for some time, and successful results from the centrifugal casting of Monel metal and semi-steel have been recorded. A Sandusky inventor has also cast steel by this process. The recent announcement of the production of cast iron car wheels centrifugally in England recalls the American process of making cast steel wheels with a manganese rim by applying the centrifugal principle to a revolving mold.

The successful operation of any process of this nature insures a product, no matter of what composition, which is of a high grade. It is a realization of quality production in quantity, for rapid output is a marked characteristic. There is also the advantage of the elimination of sand and dirt. A minimum of machining is also required. The condition of casting and cooling tends to produce a dense casting and one whose microstructure is different from the sand-cast products. Centrifugal force is substituted for sink heads as an insurance against unsoundness.

There are still many problems connected with the development of this process in general. Among these are the proper casting temperatures and the rate of revolution of the mold or apparatus. Much valuable work has already been done on these two problems. There has also been trouble with molds, but a proper metal for these has been secured in

one or two cases. In view of the progress thus far made in the art, it is probable that the centrifugal casting of metals and alloys is assured a prominent place in industry.

Aluminum's Advancing Position

A statement of the expansion in world production of aluminum, great as it has been, scarcely gives an adequate idea of the magnitude of the industry. In 10 years, or from 1911 to 1920 inclusive, the world output increased from 45,000 metric tons to 160,800 tons. The latter figure means much as to volume with a metal so light. The peak in output was 179,900 tons in 1918, when war demand was greatest. The United States still holds the commanding place it took in the early days, having been credited with over 54 per cent of the 1920 total. Twenty-five years ago, the industry was in its infancy and the metal almost a curiosity.

More and more active has been its competition with several of the older metals. A glance at the hardware dealer's shelves tells how it is vying with copper and steel enameled ware. In alloys, new and familiar, it has a large place in competition with other non-ferrous alloys and with alloy steel itself. In the building of airplanes it is a necessary raw material, and in automobile construction aluminum sheets are widely used. In the castings industry it has long been conspicuous.

Parallel to the interesting advances in uses of aluminum is the competition from Europe in the marketing of the metal. In 1920 over 38 per cent of the world's total was made by Germany, Switzerland, France, Norway, Sweden, etc. To-day imported aluminum is a factor in the American raw material market—so much so that it is a matter of concern to American smelters. Even in finished material, the market is full of German and other wares.

The interesting history of aluminum is perhaps prophetic of that of other metals, now less plentiful commercially. When aluminum was developed by an American metallurgist, it was looked upon as a curiosity, of little commercial value because of its cost. To-day magnesium, while somewhat more advanced commercially, may in the future play a role, singly or alloyed with aluminum, as commanding as that of the older metal.

Liquidation of labor in the British iron and steel industry has been rapid in the past year. Returns from 103 firms, employing 90,305 persons in October last year, show that the average weekly wages per person in that month was £3 8s. 2d. This compares with £5 8s. 0d. in September, 1920, and with £4 18s. 8d. in October of the same year. For the first eleven months of 1921, the net reduction in the weekly wages of the 239,500 employees affected by wage changes was £431,690 or £1 16s. 1d. per person. This is heavier than in any other of the seven industries compared except mining. After a severe struggle over many months, British labor is accepting the inevitable situation; the coal strike was probably an object lesson contributing to this result. The results are being reflected in rapidly increased production and exports of steel and iron.

January Steel Ingot Output Increases Over the December Rate

The Steel ingot statistics of the American Iron and Steel Institute show that 30 companies which in 1920 produced 84.20 per cent of the total, had an output in January of 1,593,482 gross tons as compared with 1,427,093 tons in December and with 1,660,001 tons in November. The increase in January over December was 166,389 tons or 11.6 per cent. The decrease in December from November was 232,908 tons or 14.03 per cent. Estimating the production of other companies on the basis of the 30 companies (though it is probable the small companies did not equal the rate of the larger ones), the total output of ingots in January was 1,892,496 tons or 75,700 tons per day, counting 25 working days for January.

In the table below, the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920 -Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,212,758	714,657	10,687	2,938,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,215	795,16	16,610	3,299,019
April	2,036,336	568,932	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,951	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	15,781	3,000,432
September	2,300,417	693,556	15,318	2,999,551
October	2,335,863	676,631	13,485	3,015,982
November	1,961,861	673,215	13,791	2,638,870
December	1,687,162	649,617	13,886	2,340,365
Total, 1920	26,197,813	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,173,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,197	1,512	1,265,519
June	808,286	193,641	1,176	1,003,106
July	689,479	112,312	575	803,376
August	915,331	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,915	315,837	1,028	1,586,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,171	296,386	1,539	1,427,093
Total, 1921	13,195,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	311,831	822	1,593,482

The January ingot production was at a yearly rate of 23,542,500 tons, counting 311 operating days to the year. This compares with a rate in November of 23,581,886 tons and with 11,857,186 tons in July, the low point for 1921.

The increase of 166,389 tons in the ingot output of all companies reporting in January contrasts with a decrease of 10,389 tons in the January pig iron output from that of December.

Volume of Business Not Satisfactory in the Youngstown District

YOUNGSTOWN, Feb. 7.—With primary steel interests, the current situation with respect to volume of business on the books is far from satisfactory. Predictions voiced earlier in the year of a turn for the better around Feb. 1 are failing to materialize. While all interests are hopeful of betterment in February, some are frankly skeptical. Some uncertainty in regard to prices is proving a retarding influence. Sheet mill capacity in the Mahoning Valley was scheduled to the extent of 39 per cent this week, as compared with 35 per cent the previous week.

The Youngstown Sheet & Tube Co. has commenced the installation of electric drives for its sheet mill units, replacing steam and necessitating partial suspension of production for the time being. The installation now under way will provide electric driving power for eight mills. Whereas all 15 units of this interest were idle last week, seven are now rolling.

New business lacks a sustaining influence in many cases. One of the major interests, operating 10 of 12 open hearth furnaces this week, has orders for 10 days' production at the current rate. It is largely restricted in active finishing capacity, and must base future schedules upon the volume of tonnage which develops in the meantime.

In the aggregate considerable strip, sheet and light plate tonnage is moving to pressed and stamped metal interests for conversion into automobile parts. For instance, the Powell Pressed Steel Co., in Hubbard, Trumbull County, is operating its plant 22-hr. per day, principally on orders for the Durant and Rickenbacher motor cars, and in a smaller way for other motor builders. Durant production, it is stated, has attained a monthly rate of 4500 cars and is keeping a number of pressed steel interests fairly well engaged.

Sheet Prices Hold

It may be said with authority that sheet prices are holding taut, especially on black sheets, quoted at 3c. for No. 28 gage, and galvanized at 4c., base gage. New business is coming forward only in a moderate way, and is confined to small lots. A moderate buyer who has been placing carload lots with regularity states that he has done considerable shopping in an endeavor to uncover a concession on black sheets, but has been unsuccessful.

Some shipments are evidently going forward at prices below the current market, but in all cases this business is under contract negotiated before the first of the year and evidently extended. Most of such tonnage, however, it is felt, has been worked off, and the sheet market is firm at prevailing levels. Doubt is expressed in some manufacturing circles as to whether a large tonnage would develop much of a concession, if any.

Interests catering to the automobile trade continue in the best position, with respect to future commitments, though there is much to be desired in this respect. One of the smaller non-integrated producers is booked approximately eight weeks ahead, but this interest is an exception.

An idea of the current situation in the sheet market may be realized from the fact that the Brier Hill Steel Co. is operating 10 of its 28 sheet mills, starting Wednesday; the Republic Iron & Steel Co. has four of 18 engaged, while Trumbull Steel Co.'s sheet output is proportionately small.

COMING MEETINGS

February

American Boiler Manufacturers' Association. Feb. 13. One-day winter meeting, Fort Pitt Hotel, Pittsburgh. Secretary, H. N. Covell, 191 Dekeman Street, Brooklyn, N. Y.

American Institute of Mining and Metallurgical Engineers. Feb. 20-21. Spring meeting Engineering Societies Building, New York. Secretary, Frederick P. Sharpless, 25 West Thirty-ninth Street, New York.

American Association of Engineers. Feb. 22. Congress Hotel, Chicago. Secretary, C. E. Draver, 63 West Adams Street, Chicago.

March

American Society for Steel Treating. March 3. Sectional meeting, Hotel McAlpin, New York. Secretary, W. H. Eisenmann, 4600 Prospect Avenue, Cleveland.

Refractories Manufacturers' Association. March 15, 16 and 17. Annual meeting, Chicago. Secretary, F. W. Donahoe.

April

National Metal Trades Association. April 19 and 20. Annual meeting, Hotel Astor, New York. Secretary, Louis W. Fischer, Peoples Gas Building, Chicago.

American Supply and Machinery Manufacturers' Association and Southern Supply & Machinery Dealers' Association. Joint Meeting, April 24 to 26, Birmingham. F. L. Mitchell, 233 Broadway, New York, is secretary of the American association and A. M. Smith, Smith-Courtney Co., Richmond, Va., is secretary of the Southern association.

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dant, business manager, 327 S. La Salle Street, Chicago.

American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Collin G. Fink, 110 Park Avenue, New York.

IRON OUTPUT DECLINES SLIGHTLY

Eight Furnaces Blown in, Seven Blown Out

January Production 335 Tons Per Day Less Than in December

The upward swing in the pig iron production of the country, which characterized the last few months in 1921, came to a standstill in January when the output of the blast furnaces showed a slight decline from that of December. The production in January was 335 tons per day less than that in December as contrasted with an increase of 6013 tons per day in December over November. A feature of the January output is the marked increase in the production of steel-making pig iron and a sharp decrease in that of merchant pig iron. The increase in steel-making pig iron in January over December was 957 tons per day and the decrease in merchant pig iron in January from that in December was 1292 tons per day.

The production of coke and anthracite furnaces for the 31 days in January amounted to 1,638,697 gross tons or 52,861 tons per day as compared with 1,649,086 tons or 53,196 tons per day in December, also a 31-day month. The decrease in January from December was 10,389 tons or 335 tons per day.

The total number of furnaces in blast on Feb. 1 was 126 as compared with 125 on Jan. 1. At the low point in 1921, or on Aug. 1, only 69 furnaces were in blast. The capacity of the 126 furnaces in blast Feb. 1 is estimated at 53,305 tons per day as contrasted with a capacity of 52,735 tons per day for the 125 furnaces in blast Jan. 1. In January eight furnaces were blown in and seven were blown out.

For the first time in many months spiegeleisen in any quantity was produced. Of the total output of manganese-alloys in January of 6874 tons 1230 tons was spiegeleisen and 5644 tons was ferromanganese. The last production of spiegeleisen in any quantity was 4015 tons in July, last year.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from January, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
January, 1921	62,227	15,618	77,845
February	58,060	11,127	69,187
March	42,691	8,775	51,468
April	37,854	5,914	43,768
May	32,051	6,340	38,391
June	29,441	6,050	35,491
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,119	5,661	32,780
October	33,365	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,025	53,196
January, 1922	42,130	10,731	52,861

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons							
	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,915	52,861
Feb.	106,456	94,173	82,835	107,066	102,720	69,187	
Mar.	107,667	104,882	105,618	99,685	108,900	51,468	
Apr.	107,592	111,165	109,607	82,607	91,827	39,768	
May	108,422	110,238	111,175	68,002	96,312	39,394	
June	107,053	109,002	110,733	70,495	101,451	35,494	
July	104,017	107,820	110,354	78,340	88,931	27,889	
Aug.	103,346	104,772	109,311	88,496	101,629	30,780	
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	
Oct.	113,189	108,650	112,482	60,115	106,212	40,215	
Nov.	110,594	106,859	111,802	79,715	97,839	47,183	
Dec.	102,537	92,997	110,762	84,914	87,222	53,196	

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These

last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695		28,088	29,018	
Mar.	2,480,668	1,323,443		85,275	41,294	
Apr.	1,968,542	1,015,621		27,628	24,310	
May	1,128,720	1,024,678		33,407	9,232	
June	2,309,770	883,312		34,751	4,536	
July	2,230,567	715,664		36,789	5,524	
Aug.	2,254,943	807,144		36,985	3,878	
Sept.	2,247,250	815,692		39,546	3,289	
Oct.	2,393,644	1,034,312		34,786	3,902	
Nov.	2,150,075	1,138,789		26,944	8,525	
Dec.	2,047,167	1,276,381		28,023	3,953	

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for January, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	January (31 days)	December (31 days)	November (30 days)	October (31 days)
New York	110,867	126,734	91,535	65,502
New Jersey	1,642	5,026	4,525	4,745
Lehigh Valley	31,296	31,388	30,020	27,614
Schuylkill Valley	42,144	41,450	35,850	28,176
Lower Susquehanna and Lebanon Valleys	28,227	26,106	19,356	20,581
Pittsburgh district	382,407	390,908	357,851	295,741
Shenango Valley	51,231	52,793	50,555	35,430
Western Penna.	45,511	56,593	67,432	61,742
Maryland, Virginia and Kentucky	22,858	18,917	14,754	15,827
Wheeling district	75,576	72,660	44,966	36,520
Mahoning Valley	190,436	188,391	165,562	157,512
Central and Northern Ohio	161,160	167,307	156,767	140,914
Southern Ohio	31,892	15,534	13,893	14,485
Illinois and Indiana	287,313	299,186	252,566	229,009
Mich., Minn., Mo., Wis. and Colo.	48,236	37,149	30,059	11,940
Alabama	121,073	117,886	108,125	99,948
Tennessee	825	1,064	1,665	990
Total	1,638,697	1,640,997	1,415,481	1,216,676

Capacities in Blast Feb. 1

The following table shows the number of furnaces in blast Feb. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Jan. 1:

Coke and Anthracite Furnaces in Blast

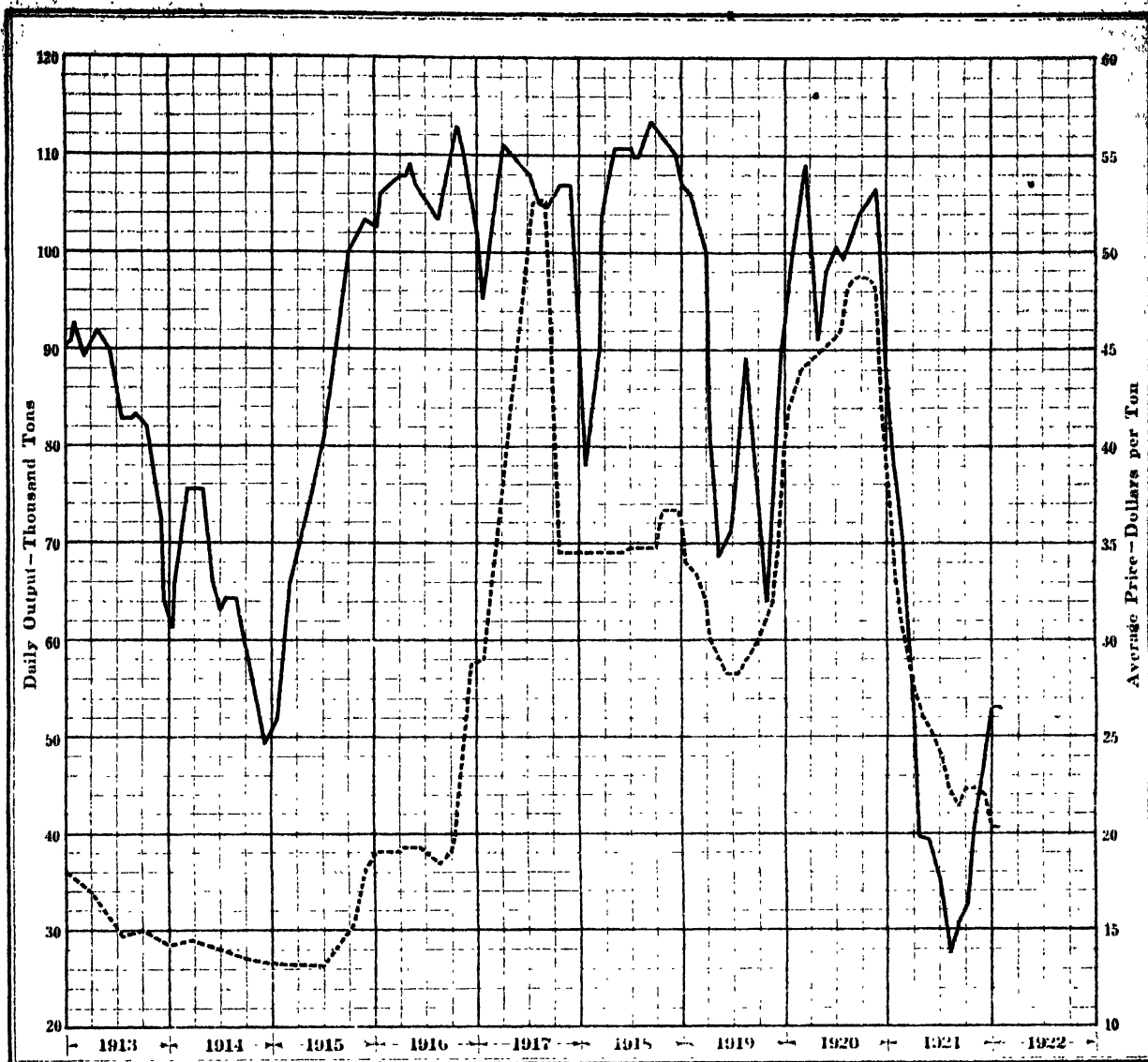
Location of Furnaces	Feb. 1—		Jan. 1—	
	Total Stacks	In Capacity Blast per Day	Total Stacks	In Capacity Blast per Day
New York				
Buffalo	22	8	9	3,850
Other New York	4	1	1	240
New Jersey	4	1	1	160
Pennsylvania				
Lehigh Valley	18	4	4	1,010
Spiegel	2	0	0	
Schuylkill Valley	15	4	1	1,400
Lower Susquehanna	10	1	1	400
Lebanon Valley	8	2	2	400
Ferro and spiegel	2	1	1	100
Pittsburgh District	55	27	26	12,000
Ferro and spiegel	4	1	1	120
Shenango Valley	19	5	4	1,750
West. Pennsylvania	26	4	5	1,845
Maryland	6	1	1	350
Wheeling District	15	5	5	2,340
Other				
Mahoning Valley	28	13	12	6,075
Central and Northern	26	12	11	5,400
Southern	16	3	2	500
Illinois and Indiana	42	17	18	9,960
Mich., Wis. and Minn.	11	2	3	1,140
Colorado and Missouri	6	2	1	255
The South				
Virginia	16	0	0	
Kentucky	7	1	1	255
Alabama	41	10	11	4,150
Tenn., Ga. and Texas	16	1	1	35
Total	419	126	125	53,735

Furnaces blown in during January were the following:

No. 4 Aliquippa and No. 6 Eliza furnaces of the Jones & Laughlin Steel Co. in the Pittsburgh district; No. 4 Newcastle furnace of the Carnegie Steel Co. in the Shenango Valley; the new Trumbull-Cliffs furnace in the Mahoning Valley; the furnace of the Upson Nut Co. in northern Ohio; the Portsmouth and Sarah furnaces in southern Ohio, and one furnace of the Colorado Fuel & Iron Co. in Colorado.

Among the furnaces blown out or banked were the following:

No. 2 furnace of the Donner Steel Co. in the Buffalo district; one Monessen furnace of the Pittsburgh Steel Co. in the Pittsburgh district; the Adrian furnace in western Pennsylvania; the Jisco furnace in southern Ohio; one Gary furnace in Indiana; one Detroit furnace, A. in Michigan.



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia.

and one Woodward furnace of the Woodward Iron Co. in Alabama.

Of the furnaces blown in, one was a Steel Corporation furnace and seven were independent steel furnaces. Of those blown out or banked one was a Steel Corporation furnace, two were independent steel company furnaces and four were merchant furnaces.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons

	1918	1919	1920	1921	1922
Jan.	2,411,768	3,802,260	3,015,181	2,416,292	1,638,697
Feb.	2,319,299	2,940,164	2,978,879	1,937,257	.....
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	.....
Apr.	3,286,211	2,478,218	2,739,797	1,193,041	.....
May	3,446,412	2,108,056	2,985,682	1,221,221	.....
June	3,323,791	2,114,863	3,043,540	1,064,833	.....
July	3,420,988	2,428,541	3,067,043	864,555	.....
Aug.	3,389,585	2,743,338	3,147,402	854,198	.....
Sept.	3,418,270	2,487,965	3,129,323	985,529	.....
Oct.	3,486,941	1,863,558	3,292,597	1,246,676	.....
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec.	3,434,617	2,633,268	2,703,855	1,649,086	.....
Ttl. yr.*	33,596,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1920 production of this iron was 228,396 tons.

Awards in Forgings and Castings

WASHINGTON, Feb. 7.—Awards have been made by the War Department on approximately 2,419,682 lb. of aeronautical motor forgings, castings, etc., at Long Island City, on bids opened Jan. 16, as follows:

General Aluminum & Brass Mfg. Co., Detroit, 402,054 lb. scrap aluminum, at \$0.12859 per lb.; McGrath Iron Co., Inc., Brooklyn, 1,257,639 lb. (561.44 gross tons) scrap iron, \$13.44 per gross ton; and H. Jaffre, 220 Broadway, New York, 747,795 lb. scrap bronze, \$0.105675 per lb., and 13,194 lb. scrap brass, \$0.085675 per lb.

The prices were for material "as is" and "where is," loading to be done by and at the expense of the purchasers. In the aggregate these prices are slightly higher than those offered on informal bids for the same material several weeks ago.

Furnace Will Use Black Sand

SEATTLE, Feb. 1.—Black sand found on the Pacific Ocean beach near Westport, Grays Harbor, southwestern Washington, will be shipped to the furnace at Tacoma, Wash., for making iron according to C. W. Atkins of Aberdeen, Wash., who says that the furnace has placed an order with him for 4000 tons as a beginning. It is stated that the furnace, which can heat the sand to 5000 degrees Fahr., will produce a good quality of iron. The first shipment will be made about March 1. Tests have been made covering a period of several years but no furnace in the Northwest was able to produce sufficient heat to make the project of commercial value.

Iron and Steel Markets

MARKET BROADENING

More Buyers; Little Increase in Tonnage

Railroad Purchases Conspicuous - Improvement in Exports - Lower Prices

A broadening demand, though without appreciably increasing tonnage and still largely for replenishment, has marked the week. With it has come a crystallization of prices on heavy tonnage products. Consumers may now buy bars, plates and shapes in smaller lots at 140c., Pittsburgh, than they could a week ago. Higher prices obtain on orders in which delivery is a prime factor.

Railroad buying has now taken the stage. The Burlington has bought 6800 cars, involving 85,000 tons of steel, the largest order of the kind in many months. The road has 500 more cars to place and the St. Paul, the Norfolk & Western and other lines bring up the total of pending cars inquiries to 6800. Most of the business still remains in the West.

A large amount of passenger equipment is under negotiation, including 50 cars for the Central Railroad of New Jersey and 50 for the Baltimore & Ohio. The Union Pacific has bought 45 cars for passenger service. The Burlington will also buy 55 locomotives, the Denver & Rio Grande 20 and other roads 10.

A total of 15,500 tons of rails has been awarded, including 8500 for the Southern Railway, which, however, has postponed until the spring the purchase of 26,000 tons of 85-lb. rails. Other pending rail business approximates 50,000 tons.

Fabricated structural steel is maintaining its conspicuous place, with awards approximating 15,000 tons and fresh projects under active consideration amounting to 17,000 tons.

Mill operations have, if anything, improved. Chicago district activity is probably in excess of 50 per cent of capacity; the Steel Corporation as a whole is operating at fully 50 per cent, while the East approximates 35 per cent. Pittsburgh reports a further increase in tin plate mill operations.

January production of pig iron was practically at a standstill as compared with December. The total was 1,638,697 tons, or 52,861 tons per day, as compared with 1,649,086 tons, or 53,196 tons per day in December, a decline of 10,389 tons, or 335 tons per day. An increase of 957 tons per day in the production of steel company furnaces and a decrease of 1292 tons per day from merchant furnaces as compared with the December data may tell the story of steel makers' participation in the foundry iron market.

Eight furnaces blew in last month and seven blew out. The number active on Feb. 1 was 126 with an estimated capacity of 53,305 tons per day against 125 on Jan. 1 with a daily capacity of 53,735 tons.

Steel production for January, based on the ingot statistics collected by the American Iron and Steel Institute for 30 companies, was 1,892,500 tons, or an annual rate of 23,542,500 tons compared with

December's rate of 21,084,250 tons. The making of steel slumped in December while pig iron manufacture then increased; and January in steel represented a close return to the November steel rate while January in iron remained above the November iron rate.

On Southern pig iron, \$15.50 is now the usual quotation, but \$15 has been named and, for the first time in several years, this iron is becoming a real factor in the North, particularly in the Chicago district. A rail and river route, which will be inaugurated Feb. 15, will still further reduce the price of delivered iron from \$1 to \$1.50 per ton. Basic iron in the Valley has receded to \$17.75, the lowest price since 1916, and malleable has declined 50 cents. In the East, there has been considerable buying by heater manufacturers, including one lot of 5000 tons by a New Jersey company.

Increased activity is noted in the export market. Following closely the 7000 tons of 100-lb. rails for South Manchuria is an inquiry for 10,000 tons of 60-lb. rails for the Imperial Government Railways of Japan. Nail business with Japan is good. American plants have difficulty at present with markets other than the Far East because of high ocean freights, particularly in competition with Europe for the heavy tonnage products. A 12,000 ton rail order for Brazil was lost to Belgium; and transportation cost is interfering with a plate order with India.

Germany has practically ceased to be a factor in international markets. What with increased ocean freights, international exchange and German export taxes, prices on some products to-day are 50 per cent higher than they were in November.

High-speed steel is weak, a 10-ton lot being bought at 65c per lb.

THE IRON AGE composite price for pig iron is now \$18.10, the lowest since September, 1916, and hardly 15 per cent above the 10-year pre-war average. The steel composite price is the lowest since December, 1915. At 2.019c. it is not quite 20 per cent above the 10-year pre-war average.

Pittsburgh

PITTSBURGH, Feb. 7.

Pittsburgh is enjoying probably the highest rate of plant operations this week than before since last fall. But as the demand is largely of a replacement or replenishment character, there is some uncertainty whether some of the capacity which has become active in the past week can be continued in operation for any considerable time. The Pittsburgh Steel Co. on Sunday night turned on the blast at one of its blast furnaces which was banked Dec. 24 and to-day started up six of its 12 open-hearth furnaces, in which no steel had been made since the holidays. The Carnegie Steel Co. is producing iron at about the rate of 50 per cent of normal capacity. This company recently put on a furnace at Newcastle, Pa., but on Sunday blew out one of this group and for this week has two of its Lucy furnaces in blast. One of the latter, however, is to be blown out for relining, probably at the end of this week. The Lucy furnaces are making ferromanganese and spiegeleisen. The Jones & Laughlin Steel Co. has seven of its 12 blast furnaces making iron and is expected to put on another at its Woodlawn, Pa., works in the near future, on ferromanganese. Of the

A Comparison of Prices .

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Feb 7, 1922	Jan 31, 1922	Jan 10, 1922	Feb 5, 1921
No. 2X, Philadelphia	\$21 14	\$21 34	\$21 34	\$32 09
No 2 Valley furnace†	19 00	19 00	19 50	28 00
No 2 Southern, Cin tit	20 00	20 00	21 00	32 00
No 2, Birmingham Ala†	19 00	16 00	16 50	27 50
No 2 foundry Chicago*	19 50	18 00	19 00	30 00
Basic, del'd, eastern Pa	19 84	19 84	20 2	31 40
Basic, Valley furnace	17 7	18 00	18 20	30 00
Bessemer Pittsburgh	21 16	21 46	21 46	33 96
Malleable Chicago*	18 50	18 50	19 00	30 50
Malleable Valley	19 00	19 50	19 50	30 00
Gray forge Pittsburgh	20 16	20 96	20 96	28 96
L. S. charcoal Chicago	30 50	30 10	31 50	40 50
Pentomanganese, del'd	58 47	58 1	60 00	90 00

Rails, Billets, etc., Per Gross Ton	Feb 7, 1922	Jan 31, 1922	Jan 10, 1922	Feb 5, 1921
O h rails heavy at mill	\$40 00	\$40 00	\$40 00	\$47 00
Best billets Pittsburgh	28 00	28 00	28 00	43 50
O h billets, Pittsburgh	28 00	28 00	28 00	43 50
O h sheet bars, Pgh	29 00	29 00	29 00	47 00
Forging billets, base Pgh	32 00	32 00	32 00	48 50
O h billets Phila	33 74	33 74	33 74	49 21
Wire rods Pittsburgh	36 00	36 00	36 00	51 00
Skelp gr steel Pgh lb	1 50	1 50	1 4	2 4
Light rails at mill	1 50	1 50	1 4	2 45

Finished Iron and Steel, Per Lb to Large Buyers	Cents	Cents	Cents	Cents
Iron bars Philadelphia	1 81	1 81	1 9	2 70
Iron bar Chicago	1 60	1 60	1 60	2 65
Steel bars Pittsburgh	1 50	1 50	1 50	2 15
Steel bars Chicago	1 50	1 60	1 60	5
Steel bars New York	1 78	1 83	1 88	2 57
Tank plates Pittsburgh	1 40	1 40	1 50	2 40
Tank plates Chicago	1 7	1 60	1 60	2 78
Tank plates New York	1 75	1 78	1 83	2 78
Beams Pittsburgh	1 40	1 50	1 50	2 25
Beams Chicago	1 65	1 60	1 60	2 63
Beams New York	1 78	1 83	1 88	2 63
Steel hoops Pittsburgh	1 90	1 90	2 00	3 00

*The average switching charge for delivery to foundries in the Chicago district is 70c per ton.
†Silicon 1 75 to 2 25. ‡Silicon 2 25 to 3 7

The prices in the above table are for domestic delivery and do not necessarily apply to export business

Sheets, Nails and Wire, Per Lb to Large Buyers	Feb 7, 1922	Jan 31, 1922	Jan 10, 1922	Feb 5, 1921
Sheets black No 28 Pgh	3 00	3 00	3 00	4 30
Sheets galv No 28 Pgh	4 00	4 00	4 00	5 70
Sheets blue and d 1 & 10	2 7	2 75	2 25	3 25
Wire nails Pittsburgh	50	50	2 50	3 25
Plain wire Pittsburgh	2 25	2 25	3 15	4 10
Barbed wire galv Pgh	1 17	1 17	3 15	4 10
Im plate 100 lb box Pgh	\$1 75	\$1 75	\$4 75	\$7 00

Old Material, Per Gross Ton	Feb 7, 1922	Jan 31, 1922	Jan 10, 1922	Feb 5, 1921
Curwheels Chicago	\$1 00	\$1 00	\$1 50	\$21 00
Curwheels Philadelphia	1 0	1 50	1 50	25 00
Heavy steel scrap Pgh	1 0	1 00	1 50	16 00
Heavy steel scrap Phila	1 00	1 00	1 50	14 50
Heavy steel scrap Chgo	11 2	11 1	11 50	15 50
No 1 cast Pittsburgh	16 00	16 00	16 25	23 00
No 1 cast Philadelphia	16 00	16 50	16 50	23 50
No 1 cast Chgo (net ton)	17 00	13 00	13 00	18 00
No 1 R.R. wrot Phila	11 0	14 50	14 50	20 00
No 1 R.R. wrot Chgo (net)	10 0	10 50	10 50	13 50

Coke, Connellsville, Pa	Feb 7, 1922	Jan 31, 1922	Jan 10, 1922	Feb 5, 1921
Foundry coke prompt	\$2 7	\$2 75	\$2 75	\$4 50
Foundry coke prompt	2 7	2 7	3 75	5 50

Metals, Per Lb to Large Buyers	Cents	Cents	Cents	Cents
Block copper New York	19 00	13 62 1/2	13 87 1/2	18 50
Electrolytic copper refinery	17 2	13 37 1/2	13 62 1/2	13 00
Zinc St Louis	4 00	4 00	4 7 1/2	5 00
Zinc New York	4 8	4 85	5 12 1/2	5 50
Lead St Louis	4 40	4 40	4 40	4 50
Lead New York	4 40	4 70	4 70	4 75
Tin (Strait) New York	32 00	32 00	32 12 1/2	32 50
Antimony (Asia) New York	4 40	4 40	4 50	5 25

Composite Price, Feb. 7, 1922, Finished Steel, 2.019c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan 31, 1922	2 048c
Jan 10, 1922	2 062c
Feb 8, 1921	2 948c
10 year pre war average	1 684c

Composite Price, Feb. 7, 1922, Pig Iron, \$18.10 Per Gross Ton

Based on average of basic and foundry irons the basic being Valley quotation the foundry an average of Chicago, Philadelphia and Birmingham

Jan 31, 1922	\$18 31
Jan 10, 1922	18 60
Feb 8, 1921	29 93
10 year pre war average	15 72

140 blast furnaces in the district bounded by Johns town, Pa., and Wheeling, W. Va., and Warren, Ohio, there are 55 now in blast. The numerical percentage is close to 40 per cent and it is the highest rate at tained in about a year. Among finishing mills the highest rate of operation still is in tin plate plants among which the number of active units has been increased by the starting of one more mill of the Washington Tin Plate Co., and a partial resumption at the Yorkville, Ohio, works of Wheeling Steel Corporation. Other classes of finishing mills at least are holding their own with last week.

Prices still reflect considerable instability, the only important exception being sheets, on which a majority of makers are holding firmly to the 3c. base for black and 4c. base for galvanized on new rollings. On sizable tonnages of plates, shapes and bars the market is 1.40c., and large buyers of nails are being accommodated at \$2.40 base per keg. This base on plates, shapes and bars is from 1c. per 100 lb. in the case of bars to 8c. per 100 lb. on structural beams and plates below the 10-year average prices of THE IRON AGE from 1905 to

1914 inclusive. The only important transaction in sheet bars the past week indicates that the market is not above \$29, Pittsburgh, on this material.

A direct sale of basic pig iron from a producer to a consumer has established \$17 75, Valley furnace, as the market on that grade. Scrap prices are drifting lower under smaller demand. Coal prices are slightly steadier as a result of purchases in anticipation of a strike of the miners on April 1.

Pig Iron—The sole feature of the past week has been the sale of 1000 tons of basic iron to a Pittsburgh district sheet maker by a Valley steel works at \$17.75, Valley furnace, and since the transaction was a direct one and did not involve resale iron, the sale establishes that price as the market. This price represents a decline of 25c. a ton and is the lowest price touched since November, 1915. The same buyer is reported to have also purchased 500 tons of resale iron slightly under that price. Malleable grade also is weaker, some recent transactions having been done at \$19, Valley furnace. Practically nothing has been done lately in foundry or Bessemer iron, prices of which are nominally

unchanged. Prices of all grades of iron are liquidating values and have no relation to costs.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$17.75
Bessemer	19.50
Gray forge	19.00
No. 2 foundry	19.00
No. 3 foundry	\$18.75 to 19.00
Malleable	19.00

Ferroalloys.—Aside from the fact that at least two makers of 50 per cent ferrosilicon have shut down their furnaces and temporarily are out of the market, the situation in ferroalloys shows no important change. The minimum asking price on this material now is \$58, furnace, freight allowed, with some makers asking \$60. Since the last business done was \$55, the market would appear to be quotable from \$55 to \$60. There have been no important transactions in ferromanganese in the week under review. All makers, including the Carnegie Steel Co., are quoting 80 per cent material at \$58.35 Atlantic Seaboard, or \$63.67 delivered Pittsburgh common freight points. We note a sale of 200 tons of 16 to 19 per cent spiegeleisen to a Valley consumer at around \$30 delivered. Interest in this material is not particularly large.

We quote 78 to 82 per cent ferromanganese, \$58.25 c.i.f. Atlantic seaboard for domestic, English and German. Average 20 per cent spiegeleisen, nominal at \$30 to \$32 delivered Pittsburgh or Valleys, 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.80; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 6 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is still inactive and prices largely are nominal. A Pittsburgh district maker of strip steel is seeking from 1500 to 2000 tons of 1½-in. to 2½-in. billets, but interest in billets generally is pretty small and this also is true of slabs. Non-integrated makers of tin plate are specifying fairly well against contracts for sheet bars, but the only important sale to sheet makers recently was one of 1000 tons which was placed at \$29 Pittsburgh. The Pittsburgh Steel Co. today started up six open hearth furnaces, after a shutdown of about six weeks.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$29; 2 x 2 in. billets, \$29 to \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$29 to \$30; forging billets, ordinary carbons, \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demands from domestic consumers are neither large nor numerous, but there is a comparatively good export demand. On domestic business the market is quotable from \$36 to \$37, Pittsburgh or Youngstown, on the base size of common soft rods, while most of the export orders are at around \$35, Pittsburgh. Prices are given on page 445.

Steel Skelp.—There is only a moderate demand and while makers generally are quoting 1.50c. for pipe skelp, the fact that large tonnages of plates can be placed as low as 1.40c. gives basis for a belief that large tonnages of skelp might be placed at the same figure.

Wire Products.—Orders and specifications have been considerably better so far this month than they were in the same period last month, but no one claims that they are as large as they should be, in view of the fact that distributors in practically all parts of the country are going along with very small stocks. The explanation undoubtedly is to be found in the uncertainty over prices, both present and prospective. There is no question that large buyers are able to obtain nails at \$2.40 base per keg, and plain wire at a corresponding reduction from the official quotation. Small buyers are trying to place business at these prices and it is because manufacturers are refusing that orders are not heavier.

We quote wire nails at \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Steel Rails.—Business in standard rails is not especially satisfactory, for in spite of the fact that the railroads tributary to Pittsburgh, have specified against February, March and April shipments they also are

seeking to have payments begin about six months hence. Makers of light rails still are holding to 1.50c. base for 25-lb. to 45-lb. sections, rolled from new steel, but are not making many sales because of competition from those rerolling old standard rails.

We quote 25 to 45-lb. sections, rolled from new steel, 1.50c. base; rolled from old rails, 1.45c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—The effort of all makers of steel bars is to maintain a base of 1.50c. and on small lots this price is obtainable, but on fairly sizable tonnages as low as 1.40c. has been done, and this may be regarded as the price to large buyers. Replacement orders are more numerous than they have been recently, but only a few really large tonnages are coming out. There is only a moderate demand for iron bars and prices are largely untested.

We quote steel bars rolled from billets at 1.40c. to 1.50c.; reinforcing bars, rolled from billets, 1.40c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Very little business of other than small tonnages is coming to fabricating shops in this district. There is some encouragement, however, in the fact that the inquiry is good, one company here in the past week having had no less than 40 requests for prices. Among the inquiries were some which have been dormant for some time, this indicating that investors still have the intention of some time going ahead with the projects. Plain material demands are few and generally small, and the common quotation of Pittsburgh mills still is 1.50c. for structural beams. However, business has been done in competitive territory at 1.40c. on fairly large lots, and the market is quotable from 1.40c. to 1.50c., according to the tonnage involved. Prices are given on page 445.

Plates.—Makers in this and nearby districts still are quoting 1.50c., Pittsburgh, but admit that only small lots can be sold at that figure and that 1.40c. has been done on attractive tonnages. Few of the latter are developing in this district, because not much business is coming to railroad equipment manufacturers here, and tank and barge builders lately have not been getting many orders.

Sheets.—Demand still reflects considerable caution among buyers, who show a continued disposition to take on only such tonnages as are actually required and to accompany the order with the shipping instructions. Demand is strictly on a replacement basis and while orders are greater in number than they were recently, they do not increase much in size and it still takes time to accumulate enough business to formulate a rolling schedule. The leading interest in proportion to its productive capacity, is faring better in current business than the independents. There are occasional deviations, but as a general proposition the market is rather well established at 3c. base for black and 4c. base for galvanized sheets, on new rollings. Concessions on wasters from regular quotations are much less than usual, due to the fact that the comparatively low operations of the mills prevent much of an accumulation of this class of material, while the demand for it is rather good. Prices are given on page 445.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—There is a fairly steady demand for standard pipe in both steel and wrought iron from jobbers for replenishment of stocks, but there is no advance buying and a portion of current production is being stocked. Several line pipe inquiries are pending, but the possibility of an early drop in oil prices is hindering the closing of this business and also is restricting the demand for oil country pipe. Observance of the discounts is not especially rigid. Discounts are given on page 445.

Boiler Tubes.—Demand is entirely of a replacement character, with few, if any, sizable orders coming out. Charcoal iron tubes are firmly held, but prices of steel tubes, especially seamless, are very much in buyers' favor. Card discounts are given on page 445.

Hot-Rolled and Cold-Rolled Sheet.—Demand is

The established price of 3.50c., base, for cold-rolled strips are few and unimportant, but on hot-rolled strips, on account of competition from sheets, plates and skelp, the regular quotation 2c., base, Pittsburgh, is merely an asking price and the bulk of the business is being placed at from 1.85c. to 1.90c. Business in both kinds of material has been rather good during the past few weeks, but represents largely the restoration of inventories which were allowed to drop pretty low over the end of last year and the first three weeks of this year.

Tin Plate.—Specifications not only are coming along well, but almost all consuming industries are represented in them. There is unusually full occupation of tin plate capacity in this and nearby districts, and the indications point to a further increase since the Washington Tin Plate Co. has succeeded in getting going on an open shop basis, and the Wheeling Steel Corporation this week is making an effort to start up some of its mills at Yorkville, Ohio, which have been idle since last June, as a result of the refusal of that interest to renew its agreement with the Amalgamated Association of Iron, Steel and Tin Workers. The Yorkville plant is being started on an open shop basis. Observance of \$4.75 per base box, Pittsburgh, for standard coke tin plate is a little more general than it was a few weeks ago.

We quote standard production coke tin plate \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—Reports about business conditions are somewhat irregular, but the experience of most makers is that buyers are merely rounding out existing stocks, and that there is no very pronounced tendency to anticipate requirements. On the other hand, one maker in this district so far this year has had orders which amount to about one-third of the total business done during 1921. The market still is quotable at 1.90c. to 2c. base, but the lower figure is on desirable tonnages and most of those now coming out cannot thus be classified. Ground shafting is unchanged at 2.25c. base, f.o.b. mill, for carload lots.

Hoops and Bands.—The market in both products is extremely limited and hardly enough is going on to definitely establish prices. The quotable range on hoops is 1.90c. to 2c. base, Pittsburgh, but the higher figure is more of an asking than a selling basis. On bands, prices anywhere from 1.75c. to 1.90c. base are heard.

Nuts and Bolts.—Demands upon makers in this district possibly are more numerous than they were recently, but individually and in the aggregate bookings are small and business pretty much localized as a result of the fact that makers in other districts are not adhering strictly to a Pittsburgh base. The New York Central Lines will open bids Feb 8 on from 5000 to 8000 kegs of track bolts. Discounts are given on page 445.

Rivets.—Makers in this district still are holding heavy rivets at \$2.25 to \$2.35, base per 100-lb. Pittsburgh, but business at these prices is confined closely to this immediate territory, for Chicago makers are quoting \$1 per ton less, f.o.b. Chicago, and this, together with the heavy freight, keeps local makers out of the Chicago territory. On the other hand, Chicago producers are not coming East at the prices they quote. Business still leaves much to be desired, for while orders are numerous enough, they are small individually and the lack of volume is discouraging. Prices and discounts are given on page 445.

Spikes.—The New York Central Lines will open bids Feb. 8 on 40,000 to 50,000 kegs. This being an exceptionally attractive order, the common impression is that it will bring out lower prices than lately have prevailed. The market now is quoted at \$2.15 to \$2.20 base per 100-lb. for standard spikes, but this order is expected to be placed at below the lower figure. Interest in small spikes is slight. Prices are given on page 445.

Old Material.—The trend of prices is down because there is almost no demand from melters and dealers for scrap on tonnages pretty sparingly since most

of them are well up with their obligations and the possibility of a slow turnover, as well as lower prices checks purchases for throwing down on the yards. Rather high prices were paid for scrap offered by the railroads this month, a dealer paying \$14.56 per gross ton, Pittsburgh, for the heavy melting steel of the Pennsylvania Railroad, Central Region. The buyer is delivering this material against a contract taken some time ago at about \$13.50, Pittsburgh. Such buying constitutes the sole support of prices. On open market transactions in heavy melting steel, \$14 has become the maximum price and the more common bid is \$13.50. Users of turnings are less anxious for supplies and prices are down about 50c. a ton. The market also is weaker on borings. Prices are nominal on low phosphorus steel scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.	\$13.50 to \$14.00
No. 1 case, cupola size.	16.00 to 16.50
Rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Huntington, W. Va., and Franklin, Pa.	15.00 to 15.50
Compressed sheet steel.	11.75 to 12.00
Bundled sheets, sides and ends.	10.50 to 11.00
Railroad knuckles and couplers.	14.00 to 14.50
Railroad coil and leaf springs.	14.00 to 14.50
Low phosphorus standard bloom and billet ends.	17.50 to 18.00
Low phosphorus plates and other grades.	17.00 to 17.50
Railroad malleable.	12.50 to 13.00
Iron car axles.	23.00 to 24.00
Locomotive axles, steel.	21.00 to 22.00
Steel car axles.	15.00 to 15.50
Cast iron wheels.	15.00 to 15.50
Roller steel wheels.	14.50 to 15.00
Machine shop turnings.	9.50 to 10.00
Sheet bar crop ends.	13.50 to 14.00
Heavy steel axle turnings.	11.00 to 11.50
Short shaving turnings.	11.00 to 11.50
Heavy breakable cast.	14.50 to 15.00
Stove plate.	12.50 to 13.00
Cast iron borings.	11.25 to 11.75
No. 1 railroad wrought.	11.50 to 12.00

Pittsburgh Rumors About Three Company Merger

PITTSBURGH, Feb. 2.—The story is current here that completion of the merger of the Youngstown Sheet & Tube Co., the Inland Steel Co. and the Steel & Tube Co. of America has been delayed because it has been discovered that the combination would not have sufficient ore lands to be fully self-contained for more than a short period. To correct this condition an effort is said to have been made to bring the Brier Hill Steel Co., Youngstown, which has a controlling interest in the Biwabik and Pennington Mining Co. into the merger. It is also intimated that negotiations have been started for the acquisition of some of the Breitung ore properties. Beside the matter of ore reserves, a desire to include a Pittsburgh district plant in the combination also is said to have hindered completion of the deal. In this connection, is a report that the Midland, Pa., plant of the Crucible Steel Co. of America is being considered. This plant has two modern 600-ton blast furnaces, a by-product coke plant comprising 100 Koppers ovens, 10 basic and two acid open-hearth furnaces, blooming, billet and bar mills and is essentially a soft steel plant, although built to provide steel for the other Pittsburgh district mills of the Crucible company, the principal business of which is tool and special steels.

The W. & B. Douglas Co., Middletown, Conn., pumps, has increased its operating schedule to four days a week in the foundry, and to five days in most other departments. The company is shipping goods as far west as California, and is doing an excellent business in Cuba and Europe.

The Four-Cylinder Car Division, Nash Motors Co., Milwaukee, on Feb. 1 resumed an 8-hour day in all departments, affecting about 400 employees who for some time have been working mornings only. B. W. Twyman is general manager.

Chicago

CHICAGO, Feb. 7.

The placing of 6800 freight cars by the Burlington is the feature of the week. This is the largest car order placed in years and will mean an addition of 68,000 tons of steel to mill books. Other good-sized railroad orders are in immediate prospect; in fact, current car purchases are exceeding the maximum expectations of the steel trade. Concomitant with better railroad buying is a steady expansion in general demand for rolled steel. Jobbers are commencing to lay in stocks and miscellaneous manufacturers from all sections of the West are placing small orders. In the building field also, there are signs of quickening activity, although obstructive union tactics are proving a hindrance here and there, notably in Chicago.

While business is improving, prices are settling to a new level, 1.55c. to 1.60c., Chicago, being commonly quoted on plates, shapes and bars, while attractive tonnages are being placed for less. Bolt and nut discounts, which have long been weak and ill-defined, are now on an f.o.b. factory basis except for products which are not made in quantity in Western plants.

In the pig iron market Southern competition is becoming a real factor, a recession in price to \$15, Birmingham, coupled with river and rail rates, having brought delivered prices practically to a parity with those from Chicago furnaces at numerous points in this vicinity.

The Inland Steel Co.'s operations have shown further improvement, steel output being on a 50 per cent basis. The Illinois Steel Co. is running at the same rate as a week ago, while the Interstate Iron & Steel Co. is operating at better than 50 per cent at its steel plant and merchant mill.

Ferroalloys.—A large local consumer has purchased 100 tons of ferromanganese at the market. A railroad equipment manufacturer is inquiring for 250 tons. An inquiry for one car of spiegeleisen is current.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$56 to \$57.50, delivered; spiegeleisen, 18 to 22 per cent, \$36.50 to \$37, delivered.

Pig Iron.—For the first time in several years, Southern iron is getting on a competitive basis with the Northern product in this territory. Southern foundry has been sold at as low as \$15, base Birmingham, or the equivalent in terms of f.o.b. furnace, and the all-rail rate brings the delivered price in Chicago to \$21.67. While this is about \$2.50 above the delivered price in Chicago for local iron, there are certain points in Chicago territory where the advantage is in favor of the South. Southern competition will be accentuated on Feb. 15, when combination rail and water rates will further reduce the delivered prices of the Southern product by from \$1 to \$1.50 a ton. The iron will be hauled by barge down the Tennessee River to Metropolis, Ill., where it will be transferred to a railroad. Each barge will hold 400 tons and a single steamer will tow from three to four barges from the furnace to Metropolis in 40 hours. Northern merchant furnaces continue to pile some iron, but report that shipments are steadily increasing in volume. While current orders and inquiries are individually small, ranging from a carload to 200 or 300 tons, interest in the market is more general than it has been since last fall. The Chicago, Milwaukee & St. Paul is inquiring for 600 tons of malleable and 100 tons of foundry for prompt delivery, and the New York Central wants eight cars of No. 2 foundry and three cars of charcoal for early shipment to its Elkhart, Ind., shops.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil. 1.50, delivered at Chicago	\$30.50 to \$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	18.50 to 19.00
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25	18.50
Northern high phos.	18.50
Southern foundry, sil. 1.75 to 2.25	21.67
Malleable, not over 2.25 sil.	18.50
Basic	18.50
Low phos., Valley furnace, sil. 1 to 2	
per cent copper free	\$9.50
Delivery, sil. 8 per cent	\$1.32 to \$1.33

Railroad Equipment.—The Chicago, Burlington & Quincy has placed orders for 6800 freight cars and still has 500 to place, being undecided as to whether they will be automobile or box cars. The distribution of the orders is as follows: Western Steel Car & Foundry Co., 1000 composite gondola cars; American Car & Foundry Co., 500 refrigerator cars, 500 stock cars and 500 composite gondola cars; Pullman Co., 500 composite gondola cars, 500 box cars and 400 refrigerator cars; Mount Vernon Car Manufacturing Co., 1000 box cars; General American Car Co., 500 box and 400 refrigerator cars; Bettendorf Co., 1000 all steel gondola cars. The Burlington will also soon place orders for 55 locomotives. The Union Pacific has ordered 25 baggage cars from the American Car & Foundry Co. and 20 coaches from the Pullman Co. The Chicago, Milwaukee & St. Paul is inquiring for 1000 box cars. The Pacific Fruit Express is expected to close for 3300 refrigerator cars during the current week. The Baltimore & Ohio is in the market for 50 passenger service cars. The Norfolk & Western is inquiring for 1000 gondola and 1000 hopper cars and also contemplates the purchase of power. The Denver & Rio Grande is in the market for 20 Pacific type engines, while the Norfolk Southern and the Kentucky & Indiana Terminal are asking for prices on five locomotives each. The New York, Ontario & Western has ordered four mountain type engines from the American Locomotive Co.

Bars.—Demand for soft steel bars continues to show gradual improvement. Not only are further specifications coming from car builders, but jobbers and miscellaneous manufacturers are commencing to replenish their stocks. Even the farm implement makers who have been practically idle for a year, are buying in a small way. In the reinforcing field, building construction is expanding and a round tonnage for spring road building has been placed. On Feb. 3 the Milwaukee Sewerage Commission opened bids on 5000 tons of reinforcing bars for the Jones Island sewage disposal plant. The Inland Steel Co. was low bidder with a figure of \$31.90 delivered on soft steel bars and will undoubtedly get the order, although a formal award will not be made until later this week. This bid is said to be equivalent to 1.475c., f.o.b. mill, after deducting freight and extras. Other bidders f.o.b. Milwaukee were: Corrugated Bar Co., \$32.95 for new steel; Concrete Steel Co., \$33.30 for new steel; Calumet Steel Co., \$29.24 for re-rolled steel; Inland Steel Co., \$29.90 for re-rolled steel; Paul J. Kalman Co., \$34 for new steel; Donner Steel Co., \$36.90 for new steel. The Kansas City Bolt & Nut Co. has closed a contract with the Kansas City Stockyards Co. to furnish 670 tons of soft steel deformed reinforcing bars for the construction of the American Royal Exposition Building. Soft steel bars are commonly quoted at from 1.55c. to 1.60c., Chicago, while attractive tonnages are moving at concessions of \$1 to \$2 a ton.

Mill prices are: Mild steel bars, 1.55c. to 1.60c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Hoops and bands, 3.13c.

Wire Products.—Demand is not so brisk as in recent weeks and more is heard of price concessions, although it cannot be said that the market has developed marked weakness. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, Page 445.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.65 per keg.

Sheets.—Notwithstanding reports of isolated concessions on galvanized in other sections of the country, the local market on sheets appears to be firm in all departments. Domestic business is commencing to revive and this, added to a good export backlog, has put the local independent mill in a comfortable position.

Mill quotations are 3c. for No. 28 black, 3.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock: No. 10 blue annealed, 3.35c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Steel Castings.—Current and prospective business is largely in steel castings required for railroad and

and locomotives. The importance of railroad orders may be grasped when it is realized that there are 40 tons of steel castings in the average locomotive and two and one-half in the average freight car. The freight car order just placed by the Burlington will result in the placing of fully 15,000 tons of steel castings. The list price and discounts on page 348-350 of THE IRON AGE of Feb. 9, indicate the current market.

Plates.—Local mills report a further increase in the volume of business. Heavy specifications continue to be received from car builders, one company having sent in rolling instructions on 10,000 tons of plates, shapes and bars within the past week. The placing of the Burlington freight cars will result in the placing of fully 85,000 tons on mill books. Other good sized car orders are in immediate prospect, so that steel producers are assured a steady stream of tonnage business for some time. Steel buying is not confined to the car shops. Jobbers are commencing to replenish their stocks, one local warehouse having placed an order for 6000 tons of plates, shapes and bars, and small manufacturers also are placing orders to take care of their immediate needs. Demand is more widely distributed than for some time and while the trade is cautious about jumping to conclusions, it is swinging to the belief that real progress towards industrial revival is being made. Prices are softening concurrently with the increase in mill bookings. from 1.55c. to 1.60c., Chicago, is commonly quoted, while attractive lots are moving at 1.50c. and less. In fact, heavy tonnages of desirable specifications have been bought by car builders at as low as 1.45c. and 1.40c. The making of sharp concessions to secure large tonnages has been a characteristic of the market ever since the present depression set in and is accounted for by the desire of mills to avoid interruptions in operations which might prove necessary if they were entirely dependent on the ordinary run of bookings.

The ruling mill quotations range from 1.55c. to 1.60c. Chicago. Jobbers quote 2.63c. for plates out of stock.

Structural Material.—Prospects of a settlement of the local building controversy were given another set back when the carpenters voted to insist on their demand for a wage of \$1.10 an hour. This action followed the unanimous decision of the Chicago Building Trades Council to accept the Landis award. While this development has again introduced uncertainty in the local building situation, prospects for construction activity in other sections of the West are steadily growing brighter. The placing of 17,137 tons of the Chicago Union Station, announced in this column last week, has been followed by the largest number of fabricating awards reported for a considerable period. Plain material prices are settling to a lower level as demand increases. From 1.55c. to 1.60c., Chicago, is commonly quoted, and on large tonnage concessions of \$1 to \$2 under those prices have been made. Recent fabricating awards include:

Equitable Life Insurance Co. Building, Des Moines, Iowa, 3200 tons, to American Bridge Co.

Putnam Department Store Building, Davenport, Iowa, 1088 tons, to Rock Island Bridge & Iron Works.

Chicago Union Mail Terminal, conveyor and structural steel supports, 370 tons, to Pittsburgh Bridge & Iron Co.

Masonic Temple, Eureka, Cal., 150 tons, to American Bridge Co.

University of Montana, Library Building, Missoula, Mont., 104 tons, to Minneapolis Steel & Machinery Co.

Alambeau Paper Co., pulp mill, Park Falls, Wis., 110 tons, to Worden-Allen Co.

Addition to Illinois Masonic Orphanage, LaGrange, Ill., 100 tons, to Gage Structural Steel Co.

Sisters of St. Mary Hospital, St. Louis, 914 tons, reinforced concrete substituted for structural steel.

The mill quotation on plain material ranges from 1.55c. to 1.60c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Bolts and Nuts.—Demand is still unsatisfactory, although some buying is being done by jobbers and the railroads, and a few automobile makers are sounding the market. Ford's operations are improving, his program for February calling for 60,000 cars. Bolt and nut discounts, although still very weak, appear to be stabilizing on a new basis. F.o.b. factory prices are the

bolts, hot pressed nuts and stove bolts, while on materials largely made in the East, such as machine bolts and cold-punched nuts, semi-finished hexagon nuts, cold-punched chamfered and trimmed nuts, and the bolts, f.o.b. Pittsburgh is still quoted. The following discounts f.o.b. factory are fairly representative for less than carload orders. On carload orders an additional discount of 5 per cent or more is not unusual.

Small machine bolts, rolled threads, 70 and 10 and 10 off; cut threads, 70 and 10 off; large machine bolts, 70 and 10 off; small carriage bolts, rolled threads, 70 and 10 off; cut threads, 70 off; large carriage bolts, 70 off; lag bolts, 70 and 10 and 5 off; hot pressed nuts, black, \$5.75 off; tapped, \$5.50 off; stove bolts in packages, 80 and 10 and 10 and 10 off; in the bulk, 80 and 10 and 10 and 10 and 2½ off.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ¾ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 to 10 off; carriage bolts up to ¾ x 8 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts square and hexagon tapped, \$3.75 off; blank nuts, \$4 off; coach or lag screws, knifed points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—St. Paul has awarded 1290 tons to the National Cast Iron Pipe Co. The United States Cast Iron Pipe & Foundry Co. is low bidder on 300 tons for high pressure pipe for the Detroit Board of Fire Commissioners. Sellers are encouraged by the amount of business in prospect. Milwaukee is expected to ask for bids on about 2000 tons Feb. 20. On Feb. 3 the sewerage commission of that city let 100 tons of miscellaneous class A pipe to James B. Clow & Sons. New inquiries include:

Minneapolis, 800 tons, bids to be in Feb. 10; Muscatine, Iowa, 650 tons, Feb. 14; Greybull, Wyo., 330 tons, Feb. 18; New Ulm, Minn., 65 tons, Feb. 28.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$45.60 to \$46.60, 6-in. and above, \$41.60 to \$42.60; class A and gas pipe, \$3 extra.

Coke.—The prospect of a coal strike has stimulated the demand for coke. For the first time in many months, foundries are contracting ahead, a number of contracts covering requirements for from six months to the rest of the year having been closed. Local by-product foundry is selling at \$10.75 delivered Chicago switching district, while Connellsville can be bought for less.

Old Material.—Although a tendency towards weakness is reported in some quarters, consumptive buying has been too limited to establish any material changes in prices. Among the few recent transactions may be mentioned purchases of 2000 or 3000 tons of malleable by two local foundries at \$13 per gross ton delivered, and purchases by an iron mill of 500 tons of No. 2 wrought at \$10 per net ton delivered and approximately 250 tons of No. 1 busheling at \$8.25 per net ton delivered. Railroad lists include the Pennsylvania South-Western Region, 5000 tons; the Union Pacific, 2500 tons; the Pere Marquette, 2000 tons; the Pullman Co., 1000 tons; the Chicago & Eastern Illinois, 900 tons; and the Erie, a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows.

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Relaying rails	20.00 to 25.00
Cast iron car wheels	15.00 to 15.50
Roller or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.25 to 11.75
Frogs, switches and guards cut apart	11.25 to 11.75
Shoveling steel	10.75 to 11.25
Low phos. heavy melting steel	13.50 to 14.00
Drop forge castings	7.50 to 8.00
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.50 to 9.00

Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	12.50 to 13.00
No. 1 busheling	8.25
No. 2 busheling	6.00 to 6.50
Cut forge	10.00 to 10.50
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.25 to 11.75
Coil springs	12.50 to 13.00
No. 1 machinery cast	13.00 to 13.50
No. 1 railroad cast	12.50 to 13.00
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	9.50 to 10.00
Machine shop turnings	4.50 to 5.00
Cast borings	6.00 to 6.50
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75

NEW YORK, Feb. 7.

Cast-Iron Pipe.—The optimism that has been felt for some time past continues. Prices are firm. In this district, two municipal lettings will be made; one on Feb. 10, for furnishing 600 tons of 8-in. to 16-in. cast-iron pipe to the New York City Department of Water Supply, Gas and Electricity; the other on Feb. 14, for about the same tonnage of 8-in. to 16-in. pipe to contractors holding municipal contracts. We quote per net ton.

L.o.b. New York, carload lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Coke.—The coke market is developing considerable more activity, due largely, it is believed, to the prospect of the coal strike in the bituminous regions April 1. Many foundries are showing a disposition to accumulate stocks. Connellsville foundry coke is quoted at \$2.75 to \$3.50, ovens, a rather wide range, but there is little good coke available at less than \$4. By-product coke is selling at \$8.59 delivered New Jersey points, this being on the basis of \$4.25 for Connellsville coke and \$4.34 freight.

Old Material.—There is no appreciable change from last week. Buyers continue to show some activity with a strong bearish tendency. In most instances they evidently consider the present market from \$1 to \$1.50 per ton too high on heavy melting steel. Sellers are, however, holding rather firmly to current prices. Some activity is noted in New England, a Worcester consumer having closed with a Massachusetts seller on a small quantity of heavy melting steel. A broker with a branch office in New York has reduced his buying price on cast borings and machinery cast by 50c. per ton. Short length steel rails are off about 25c., while heavy melting steel is fairly firm at \$8 to \$8.50 per ton, last week's quotation.

Buying prices per gross ton, New York, follow	
Heavy melting steel, yard	\$8.00 to \$8.50
Steel rails, short lengths, or equivalent	8.25 to 8.75
Revolving rails	9.50 to 10.00
Relaying rails, nonmetal	25.00 to 28.00
Steel car axles	10.00 to 10.50
Iron car axles	18.50 to 19.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	8.50 to 9.00
Forge fire	5.00 to 5.50
No. 1 yard wrought, tone	9.00 to 9.50
Cast borings (heavy)	7.00 to 7.50
Machine-shop turnings	1.00 to 1.50
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	7.25 to 7.75
Stove plate	9.75 to 10.25
Locomotive grate bars	9.50 to 10.00
Malleable cast (railroad)	8.00 to 8.50
Car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton, follow:	
No. 1 machinery cast	\$16.50 to \$17.00
No. 1 heavy cast (column, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Bids on Tunnel Postponed

Bids for construction work and materials on the Hudson River vehicular tunnel were postponed at 3.30 p. m. Feb. 7, one-half hour after the scheduled opening, in response to the plea of four contractors that they could not obtain their bonds by Feb. 7. Duplicate resolutions were passed by the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission, in executive session, stating that the public interest demanded that the opening of bids be deferred until Feb. 15, at 3.00 p. m., in the Hall of Records, New York, up until which time proposals will be accepted. The following is the resolution as passed by both commissions:

Be it resolved by the New York State Bridge and Tunnel Commission (the New Jersey Interstate Bridge and Tunnel Commission concurring) that the public interest demands that the opening of bids on Contracts Nos. 3 and 4 be and the same hereby is deferred, and that sealed bids and proposals will be received at the Office of the Commissions, Room 617, Hall of Records, New York, until Wednesday, the fifteenth day of February, 1922, at 3 o'clock p. m., Eastern standard time, at which time or at a later date to be fixed by the commissions the proposals will be publicly opened.

The Nichols-Lintern Co., Cleveland, manufacturer of the Lintern electro-magnetic sander and the well known N-L line of electric railroad car equipment, is moving into a new factory building especially designed for its requirements. The company has been active since 1913. Officers are: William Lintern, president and manager; John B. Lintern, vice president; Lewis B. Foote, secretary and treasurer.

Cleveland

CLEVELAND, Feb. 7.

Iron Ore.—The effect of the restoration of the higher rail rates on ore was shown in the movement from Lake Erie docks during January. Consumers increased their dock shipments in December in order to avoid paying the higher freight charges and the movement from the docks fell off sharply during January, dock shipments for the month being only 211,533 gross tons as compared with 597,398 tons during December. Dock shipments during January, 1921, were 723,294 tons. The dock balance Feb. 1 was 8,223,216 tons as compared with 9,217,089 tons on the same date a year ago.

We quote delivered lower lake ports. Old range Bessemer, 55 per cent iron, \$6.15; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—Sales during the week were rather light and soft spots have appeared in prices on foundry iron, which is the only grade that is active. A number of sales of foundry iron, including a 500 ton lot to a sanitary interest, are reported at \$19 for No. 2, but some business has been booked at \$18.75 or lower for shipment to competitive points and in a few cases \$18.50 quotations have appeared. However, a lot of about 400 tons of iron running 1.15 to 1.60 in silicon brought \$18.50. A sale of 100 tons of low silicon malleable iron is reported at \$18.25. One selling agency booked 3300 tons during the week in lots of 200 tons and under. Consumers continue to follow the policy of buying in small lots. As an example, one foundry that is melting close to 1000 tons of iron per month has been for some time placing two 100-ton lot orders per week. Locally the demand has improved, several sales in lots of 200 tons and under being made during the week, all at the base price of \$20 for foundry iron. Among inquiries is one from a western Pennsylvania consumer for 500 tons of foundry iron on which \$18.50 is reported to have been quoted and one from an Ohio east iron pipe foundry for an unspecified tonnage. The Allegheny Steel Co. has purchased 500 tons of additional resale basic iron which will be shipped from a nearby furnace. Southern iron has declined about 50c. to \$15.50. One Alabama producer is quoting No. 2 iron at a price equivalent to \$15.60 Birmingham. All producers report an improvement in shipping orders. Many foundries are busier and are taking more iron than they have been. One Cleveland foundry that specializes on automobile castings which has been melting little iron recently has released 500 tons for February shipment. M. A. Hanna & Co. will blow in their "B" furnace in Detroit this week to take the place of their "A" furnace, which had to be blown out about three weeks ago because of an accident.

Quotations below are each based furnace for Northern foundry iron not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points or a \$3.36 rate from Jackson and a \$0.65 rate from Pittsburgh.

Basic	\$16.00
Southern No. 2 (fry)	1.75 to 2.25
Southern (fry)	1.75 to 2.25
Old range Bessemer	32.86
Standard low alloy	32.00

Bolts, Nuts and Rivets. The interest of bolt and nut makers is centered on several thousand tons of large bolts required for the vehicular tunnel, New York, for which bid will be opened Feb. 15. Keen competition is expected to bring out some very low prices. Orders improved somewhat during the week, but buying is almost wholly in small lots. While lower prices are reported in other districts, Cleveland makers are inclined to hold to regular quotations. Rivet orders are still light. Orders that are being taken by local makers are at regular prices as they are not inclined to meet the concessions of \$1 to \$2 a ton that are being named by some rivet makers.

Finished Material.—Encouraging reports are coming from various metal working industries indicating an improvement in plant operations and these are reflected in some improvement in small orders for miscellaneous lots of steel. A leading Detroit automobile manufacturer during the week gave out specifications for con-

siderable tonnage for early shipment on existing contracts. An Ohio axle manufacturer is inquiring for 300 tons of bars. The demand for wire from manufacturers has improved and a fair volume of business is coming out in welded pipe and tin plate. The principal development in the price situation during the week is a little further easing off, permitting consumers to buy smaller lots of steel bars, plates and structural material at 1.40c than they could a week ago. However, 1.50c. is still the recognized market price and small lot orders are being looked at that price. With the prevailing market weakness, consumers are buying only for immediate requirements and some are believed to be holding back small orders with the expectation of getting the 1.40c. price. Hoops are weak and the 1.90c. price on these is becoming more general. The demand for hot-rolled strip steel has improved, but the price is irregular. One strip mill has taken some business at 1.85c. Cold-rolled strip steel is still dull but firm. Little activity is developing in the building field. The Alliance Structural Co., Alliance, Ohio, has taken the bank building for the Elyria Saving & Trust Co., Elyria, Ohio, requiring 200 tons. The new plant of the Sandusky Cement Co., Cleveland, to be built at Sylvania, Ohio, will require 1500 tons of structural material. An inquiry is pending for 200 tons of reinforcing bars for a school building in Elyria. The Sinclair Oil Co. has placed additional oil tanks requiring 1500 to 2500 tons of plate. Reports have reached here that another lake boat has been placed with a Canadian shipyard. This is for a sand and gravel carrier of Welland Canal size.

Jobbers quote steel bars 2.35c.; plates and structural shapes 2.45c.; No. 9 galvanized wire 3.25c.; No. 9 annealed wire 2.75c.; No. 25 black sheets 3.75c.; No. 25 galvanized sheets 4.75c.; No. 10 blue annealed sheets 3.10c.; hoops and bands 2.96c.; cold-rolled rounds 2.25c.; flats, squares and hexagons 2.75c.

Sheets.—The demand continues slow. While regular prices appear to be holding well, there are reports that black sheets have been shaded \$5 a ton to 2.75c. by one or two mills and there is still irregularity in the heavier gages of blue annealed sheets on which quotations of 2.10c. or possibly lower are being made for No. 10 gage. Plate mills are quoting unannealed sheets on a 1.50c. plate base, or 1.80c. for No. 10.

Tool Steel.—High speed tool steel is very weak. While small orders are being taken at 80c. to 85c. per lb. for 18 per cent tungsten steel, it is understood that an inquiry for a 10-ton lot has brought out quotations around 65c. per lb.

Coke.—The market is not as active as it has been, but there is still some demand for small lots of foundry coke. Prices are unchanged at \$4 to \$4.25 per ton for standard Connellsville foundry coke.

Old Material.—The market continues dull, but prices are holding fairly well. About the only activity during the week was between dealers who purchased some small lots of scrap to clean up on old orders, mostly with Youngstown mills. Some of the mills are buying small lots of scrap when offered at attractive prices. There seems to be some disposition among consumers to cut production costs by buying the cheapest grade of scrap that they can use in open-hearth furnaces. Recent buying by a Cleveland consumer has resulted in a little further stiffening of prices on blast furnace scrap, but lower than the quoted prices would have to be named for shipment from Cleveland to mills in Youngstown and other districts.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	\$12.00 to \$12.50
Steel rails under 3 ft.	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	9.00 to 9.25
Machine shop turnings	9.00 to 9.25
Mixed borings and short turnings	9.00 to 9.25
Compressed steel	9.00 to 9.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.50 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.75 to 9.00
Drop forge flashings, over 10 in.	8.75 to 9.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Birmingham

BIRMINGHAM, Feb. 6.

Pig Iron.—In spite of the fact that some iron has been sold under \$16, the Birmingham base was nearer that than any other figure at the close of the first week in January and indications pointed to firming up. One maker reports the largest number of sales covering greater territory than in two months. Tonnage was not large, but indicated decidedly more active interest. It is understood that a Southern pipe maker secured Birmingham iron in a 500-ton lot at \$15.50. This was made in competitive territory, also handrunning with sales both in the South and outside at \$16. Pacific Coast business was at \$16. Departures from the \$16 base do not seem to have reflected abandonment of that base, but represented direct and keen competition in each instance. Trade seems to have learned to differentiate between Birmingham and Sheffield iron, the latter having a freight differential of 40c. to 80c. to competing points. Judging by reports from stove plants and other foundries, melt in the South is getting back toward the November capacity. One maker, who entered January with 2000 tons on books, shipped make and 1000 tons out of stocks. He entered February with 6000 tons on books for prompt delivery and will ship make and exhaust stocks. The tone of the market was altogether stronger at the end of the week than at the beginning. Several lots of 500 and 600 tons have been taken by Ohio and St. Louis melters, and Louisville melters took two 100-ton lots at \$16 base. Pipe plants are buying more iron than in some time with indications of increasing tendency.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1 1/2 to 2 25	\$15.50 to \$16.00
Basic	15.00
Charcoal, warm blast	32.00

Finishing Mills.—For the first time in many months the Tennessee company this week went to 77 per cent of ingot production, seven of the nine open-hearth furnaces operating following six the week before, five the week before that and four to five average the past year. Bessemer plate, guide and bar mills are on double turn. The rail mill went from 6000 to 8000 tons. The structural steel mill resumed. The car works and tie-plate plant continue going. Seven thousand tons of rails for Japan left Mobile a few days ago. The Gulf States Steel Co. is resuming at its blast furnace, but open hearths are down.

Cast Iron Pipe.—A ship out of Mobile carried 3500 tons of high pressure and sanitary pipe to California points, including San Diego, San Francisco, Menlo Park, Alhambra, Calexico and several other points, with more to follow. Sanitary pipe is opening up slowly. Dome makers are guaranteeing against price declines. The base is \$37. McWane Cast Iron Pipe Co. has begun making shipments of special handlengths of high pressure pipe and plans manufacture of pipe as small as one in. in diameter. Honolulu has taken a quantity. Birmingham makers expect to land the 3000-ton order for Schofield Barracks, Honolulu.

Coal and Coke.—Governor Kilby has offered to buy the properties of the Montevallo Mining Co., in bankruptcy, and operate them for the State with convicts. Convicts were used there by the company under lease. Coal operators do not like the plan and may contest the State's right to take this step. The matter is before the Federal court in bankruptcy. Coke is rather weak at \$5 to \$5.25.

Old Material.—Increasing operations at some steel plants give hope of some business there soon. Cast scrap is moving in fair quantities but dealers cannot get out of the district. The business is altogether unsatisfactory.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$11.00 to \$12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Feb. 7.

Pig Iron.—The situation is uncertain in this territory. On the one hand, eastern Pennsylvania and Buffalo furnaces openly talk of stiffening prices, but definite information regarding going business is lacking. On the other hand, Northern iron is offered at \$18.25, furnace, and it is still possible to obtain eastern Pennsylvania at \$19.50 or less, depending on the tonnage involved. The only two sizable tonnage prospects, the Saco Lowell Shops, Boston, and the Gurney Heater Co., Framingham, Mass., have been covered. Sentiment among foundries is hopeful, but incoming business develops slowly and the gain in the daily New England melt is hardly perceptible. Comparatively few foundries are anticipating pig iron requirements. Purchases are mainly for the purpose of keeping enough stock on hand for mixture purposes, usually involving car lots. The pig iron market to-day is without its incentive. The trade can only guess what would happen if open bids on several round tonnages were asked at one time. Last week a Providence, R. I., melter inquired on a small tonnage of No. 2X iron. With the inquiry it was stated the buyer expected to do \$18, furnace. A Buffalo interest offered \$18.25, furnace. That price developed competition from eastern Pennsylvania iron interests. In addition to the above mentioned tonnages closed, the Malleable Iron Works, New Britain, Conn., has bought 200 tons No. 2X at private terms; a Massachusetts stove maker 500 tons No. 2X, Buffalo, at approximately \$23.50 delivered and another Massachusetts foundry 200 tons No. 1X, Buffalo, at \$19, furnace. Otherwise sales reported are confined to car lots at prices that suggest no stiffening in pig iron values, if silicon differentials are taken into consideration. Local Virginia furnace representatives say prospects of furnaces being blown in within the near future are bright.

We quote delivered at common New England points as follows, having added to furnace prices \$1.00 freight from eastern Pennsylvania, \$5.45 from Buffalo, \$6.95 from Virginia and \$10.56 from Alabama:

East Penn., sil 1.75 to 2.75	\$11.00 to \$24.56
East Penn., sil 1.75 to 2.75	23.36 to 24.96
Buffalo, sil 2.25 to 2.75	23.14 to 24.96
Buffalo, sil 1.75 to 2.25	23.14 to 24.16
Virginia, sil 2.25 to 2.75	29.08 to 30.98
Virginia, sil 1.75 to 2.25	28.58 to 29.58
Alabama, sil 2.25 to 2.75	27.16
Alabama, sil 1.75 to 2.25	26.60

Warehouse Business.—The movement of iron and steel out of warehouse stocks, in the aggregate, continues to improve, but slowly. Individual orders are for small amounts of stock, but more orders are coming in. The demand for sheets and structural steel is relatively better than that for bars, flats, etc. Jobbing prices on wire nails have been reduced from \$3.50 and \$3.75 to \$3.40 per keg base, while cut nails have been reduced 10c. per 100 lb. to \$4.15 per keg base. Wood screws are $2\frac{1}{2}$ points lower on the print. The demand for bolts and nuts is expanding, but business is far from brisk.

Jobbers now quote: Soft steel bars, \$2.55½ per 100 lb. base, flats, \$3.05½, concrete bars, stock lengths, \$2.55½, structural angles and beams, \$2.65½, plates, \$2.65½ to \$2.7½, tire steel, \$3.85 to \$1.25; open hearth spring steel, \$4.00, crucible spring steel, \$11.50, bands, \$3.15½ to \$3.3½, hoop steel, \$3.15½, cold rolled steel, \$2.40 to \$3.96, toe calk steel, \$3, refined iron, \$2.55½ per 100 lb. base, best refined iron, \$4.25; Wayne iron, \$5.50, Norway iron, \$5.50, No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheet, \$4.50, No. 28 galvanized sheets, \$5.00.

Coke.—Both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., have reduced their price on by-product foundry coke 25c. a ton to \$10.15 delivered where the local freight rate does not exceed \$3.40. The movement of coke from ovens to foundry yards shows the first encouraging increase noted in months. The movement is not based on any material increase in foundry outputs but rather on a desire to insure a supply of fuel should the threatened strike at the mines develop.

Old Material.—The market is less active, but no weakening in prices is noted. If anything, prices on some materials are firmer. For instance, as high as \$9 was paid this week at shipping point for chemical borings, which represents an advance of about 25c. During the last few days, the upward tendency in bor-

ings prices has been checked by larger offerings by metal turning industries. Buying of machine shop turnings by Massachusetts nail and other interests has served to lift the market 75c. to \$1. The nail maker is paying \$6 delivered for turnings. Buying of blast furnace borings and turnings has strengthened quotations for the better offerings. Dealers are still paying \$5 for forged scrap. A New England horseshoe maker, running full, is paying \$15 delivered for railroad wrought, and buying every few days. Dealers' inquiries for horseshoes at \$13.50 shipping point discloses a scarcity of such scrap. The market on machinery cast, stove plate, malleable, heavy melting steel, yard wrought, car axles, shafting and wheels is virtually at a standstill. Dealers and consumers apparently are as far apart on price as ever, with no indication of either side giving in.

The following prices are for gross ton lots delivered common points.

No. 1 machinery cast	\$18.00 to \$18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	15.00
Railroad malleable	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points.

No. 1 heavy melting steel	\$8.00 to \$9.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe (1-in. to 6-in., over 2 ft. long)	7.00 to 7.25
Machine shop turnings	4.00 to 4.50
Cast iron borings, machine and	7.50 to 8.00
Cast iron borings, channel	8.50 to 9.00
Blast furnace borings and turnings	3.50 to 4.50
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axle and shafting	10.50 to 11.00
Car wheels	11.50 to 12.00
Revolving rails	10.00 to 10.50

St. Louis

ST. LOUIS, Feb. 7.

Pig Iron.—An improvement is noted in the buying of pig iron, but this buying is still almost entirely confined to carload orders, which are for quick shipment. About the largest sale of the week was 150 tons, and the biggest inquiry pending is for 400 tons from a southern Indiana melter for first quarter delivery. One of the encouraging factors in the trade is the stove foundry situation. Buck's Stove & Range Co., one of the largest concerns in the district, resumed operations on Feb. 1. An adjustment of the labor situation is all that is keeping the Belleville, Ill., plants from resuming operations, and some of the Quincy, Ill., and Hannibal plants are operating. Southern iron has declined to \$15.50, Birmingham, while the market for Northern iron is at \$19, Chicago.

We quote delivered consumers yards St. Louis, as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sil 1.75 to 2.25	\$21.80
Northern malleable, sil 1.75 to 2.25	21.80
Local	21.80
Southern foundry, sil 1.75 to 2.25	21.41

Finished Iron and Steel.—Business is quiet in the finished iron and steel trade. Pending adjustment of the labor situation here, the demand for structural material has fallen off until there is hardly anything being done. The contract for the Jewish Hospital at Memphis, Tenn., involving 300 tons of reinforcing bars, went to the James Alexander Construction Co., that city. The Vincennes Bridge Co. is getting prices for the 2000 tons of structural shapes for bridges at Muskogee and Gore, Okla., being undecided whether to buy the material already fabricated or to do the fabricating. The railroads centering in St. Louis have issued no inquiries for several weeks, and one line has issued instructions that no more buying be done until after March 1.

For stock out of warehouse we quote: Soft steel bars, 2.62½ per 100 lb. iron bars, 2.62½; structural shapes, 2.72½; tank plates, 2.72½; No. 10 blue annealed sheets, 3.47½; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52½ per 100 lb.; boiler rivets, \$3.62½; tank rivets 7 16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-15 per cent; hot pressed nuts, square or hexagon blank, \$4 and tapped, \$3.75 off list.

Coke.—Foundries in the St. Louis district are buying more coke, but orders still are largely confined to carloads. Consumers are content to buy only as they

need the coke and order for immediate shipment. There is an improvement in the demand for domestic coke.

Old Material.—No buying by consumers and only a few transactions between dealers was the week's record in old material. The market remains weak and although no lowering of prices has been noted, the tendency is downward. Railroad offerings before the week follow: Chicago & Alton, 1200 tons Pennsylvania System (Southwestern Region), 5000 tons.

We quote dealers' prices for consumers' works, St. Louis Industrial district and as follows:

Old iron	\$11.00 to \$14.50
Steel	10.00 to 11.00
Steel	12.50 to 13.00
Cast iron	23.00 to 28.00
Cast iron	13.50 to 14.00
No. 1 heavy railroad iron	10.00 to 10.50
No. 1 heavy railroad iron	9.75 to 10.00
Delivery	9.50 to 10.00
Light	10.00 to 10.50
Delivery	4.00 to 4.50
Cast iron	9.50 to 10.00

Per Net Ton

Heavy melting steel	6.00 to 6.50
Low phosphorus	13.00 to 13.50
Steel	9.00 to 9.50
Iron	18.00 to 18.50
Steel	12.50 to 13.00
Wrought	15.00 to 15.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad spring	10.00 to 10.50
Steel complete and knuckles	10.00 to 10.50
Locomotive tire	8.00 to 8.50
Smooth	8.00 to 8.50
No. 1	8.00 to 8.50
Cast iron	5.50 to 6.00
No. 1	8.00 to 9.00
No. 1	8.00 to 8.50
No. 1	12.00 to 12.50
Stove plate	11.00 to 11.50
Railroad malleable	8.50 to 9.00
Agencies	9.00 to 9.50
Paper	7.50 to 8.00
Heavy railroad	5.50 to 6.00
Light railroad	3.50 to 4.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	3.00 to 3.50
Couplers	6.00 to 6.50
Unreinforced	7.00 to 7.50
Horse shoes	9.50 to 10.00
Railroad brake shoes	9.50 to 10.00

Buffalo

BUFFALO, Feb. 6.

Pig Iron.—Prices have weakened and the market is quiet. A base price of \$18.50 is quoted by one furnace and \$19 is quoted on any tonnage by several others, but no big business has developed out of these concessions. Sales for the week did not exceed 7000 tons and were principally carload lots. Inquiry for delivery later than second quarter has not appeared up to date and the only request for prices on iron for late in the year is in connection with the vehicular tunnel project, but no Buffalo furnace has deviated from the policy not to try for this business under present conditions. A furnace which has contracts of long standing finds encouragement in shipping instructions just received which call for the shipment of 1000 tons per month until further notice.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1	\$19.50 to \$20.00
No. 2	19.00 to 19.50
No. 3	18.50 to 19.00
Base	18.00 to 18.25
Malleable	19.50
Lake Superior charcoal	31.75

Finished Iron and Steel.—Except for a lively demand for certain wire products such as cloth and netting, the market is apathetic. Orders are small and little of any unusual interest is apparent. Sheet prices are firmer than any other and on a 200-ton inquiry for black sheets sent out by a Buffalo buyer, every mill quoted 3c. The largest bar inquiry now engaging mills and agencies is one for 500 tons and prices as low as \$1.42½ have been quoted. Structural business is unusually dull. The local Erie Railroad car shops have been taken over by a corporation formed for that purpose and known as the Seneca Construction Co. William H. Fitzpatrick, Jr., is the president. Sellers are informed that agitation for more favorable freight rates has something to do with the lack of interest in products.

Old Material.—Brokers are interested in obtaining prices on 25,000 tons of turnings and borings and a

few dealers who are in touch with various tonnages in these products are quoting \$12 on borings and \$11 on turnings, delivered Pittsburgh. Production is extremely light and it is not likely the order could be placed here in full if the prices are found favorable. The steel situation is unchanged and prices have not been advanced.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$13.00 to \$14.00
Low phosphorus	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Warehouse Business.—An increase in the number of orders but for slightly less quantities is noted, but generally warehouse business is dull.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.40c.

Cincinnati

CINCINNATI, Feb. 7.

Pig Iron.—The Cincinnati market was rather quiet during the week, but indications point to a more active period just ahead. In the district proper, few sales of any consequence were reported, and even carload business fell off somewhat. The more important sales were one of 300 tons of Southern to an Indiana melter at \$15.50 base, Birmingham; one of 200 tons of Southern to a Kentucky melter at the same figure; another of 250 tons of lake iron to a Dayton melter at a price reported to be \$18, furnace base, and 250 tons of Jackson County silvery at the full schedule. Outside the district, a sale of 1,000 tons of Chicago iron was made to a Michigan melter at around \$18.75 furnace. Inquiries current include one for 500 tons from a central Ohio manufacturer; one from an Indiana sanitary manufacturer for 500 tons; one from a western Indiana melter for 400 tons, equal parts of Northern and Southern, and a 350-ton inquiry for high silicon iron from Indianapolis. A Michigan melter is also inquiring for 500 tons of malleable and an Indiana manufacturer is expected to enter the market shortly for a round tonnage of basic. Prices show little change, but weakness in some markets is more apparent. At least two Southern furnaces are now quoting \$15.50, base and it is reported that lake furnaces have shaded \$18. Chicago iron is regularly quoted at \$18.75 to \$19. Southern Ohio furnaces are adhering firmly to \$19.50 to \$20 and sales have been made at both figures. On Bessemer iron it is said that \$19, Ironton basis has been done. Settlement of the molders' strike in Cincinnati and some adjacent cities is looked upon as an encouraging sign and it is expected that a slow but steady increase in the melt will be seen from now on.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$20.00 to \$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	20.50 to 21.00
Ohio silvery, 8 per cent sil.	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.02 to 22.52
Basic Northern	21.02
Malleable	22.02 to 22.52

Finished Material.—The past week was rather quiet in the finished material market, the largest order reported being for 300 tons of structural material for stock purposes. A tentative inquiry for several hundred tons of sheets is before the trade and will probably be placed if the buyer can develop a price of 3.75c. on galvanized sheets. It is reported that this price can now be done from some of the small mills on orders of 100 tons or over, as a local buyer claims to have placed

Philadelphia

PHILADELPHIA, Feb. 7.

Recently an order for 500 tons of galvanized sheets at this figure. The larger companies, however, are strictly maintaining the 3c. and 4c. base and report during the week a slight improvement in the number of orders placed. There is no indication of buyers contracting ahead, as most of the orders placed are for one and two carloads for immediate shipment. The same condition also applies to bars, shapes and plates. Reinforcing bars, however, are in more demand, as some projects involving 100 tons and over, are before the trade. On wire products, there is a fair demand for wire fence and wire nails, but prices are inclined to weakness, reports having been heard of a \$2.40 base on nails during the week. Low prices are hard to confirm, but some sellers, who are quoting the regular prices which have been in effect for some time are losing orders and the supposition is that smaller mills are taking the business at lower figures. Prices on bars, shapes and plates are about the same as last week, 1.45c. being the regular price on small tonnages with 1.40c. for larger tonnages. In the structural field, there is very little activity, and no new projects have come up. The only award made during the week was a high school building for Columbus, Ohio, to a Detroit general contractor. This project will involve 200 tons of structural steel. The Federal Reserve Bank building at Nashville, Tenn., which will take a substantial tonnage, is held up for the time being. A number of projects involving considerable tonnages of reinforcing bars are up, including an office building for the Edwards Mfg. Co., Cincinnati, a Masonic hall at Dayton, Ky., and addition to the auditorium of the National Cash Register Co. Dayton, Ohio. The Business Men's Club building at Cincinnati is also up for bids. This involves 150 tons of structural steel and about 800 tons of reinforcing bars. Plans have also been approved for a viaduct at Cincinnati to cost \$1,500,000. This work will probably come up later for bids. Chicago and New York capitalists are reported to have purchased property in Columbus, Ohio, and will erect two apartment buildings costing \$1,000,000 each. The Jersey Cereal Food Co., Cereal, Pa., is planning the erection of a new plant somewhere in the Middle West and it is expected that Columbus, Ohio, will be favorably considered.

Warehouse Business.—Warehouse business is unusually quiet, orders during the week being few. Local warehouses are suffering somewhat from mill competition, as no order apparently is too small for a mill to place on its books. Some activity is reported by wire and nail jobbers. Prices are unchanged.

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.85c. base; cold rolled rounds, 1 1/2 in. and larger, 5.50c. base; under 1 1/2 in. and flats, squares and hexagons 4c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.00 per keg base; No. 9 annealed wire \$2.80 per 100 lb.

Coke.—There is more activity in the coke market, but whether this movement has any connection with the threatened coal strike or increasing foundry operations is hard to determine. At any rate, inquiries are more plentiful, and prices have a tendency to stiffen. Some producers of domestic coke have raised their prices 15c. a ton, the quotation now being \$2.90, Connelville. Other prices are unchanged.

Old Material.—There is absolutely nothing being done in the scrap market in this district, according to dealers. Consumers are apparently going to liquidate present stocks before replenishing, and dealers are expecting an advancing market when buying is resumed.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	\$3.50 to 4.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Revolving steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axes	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Tires and flues	4.00 to 4.50

What change there is in the steel trade in this section is for the better. One manufacturer of plates reports that business in January was the largest in any month since November, 1920. Thus far in February, the January record has been maintained. Another plate maker has five furnaces active. These furnaces were idle in December; ingot output is about 35 per cent of capacity. An eastern Pennsylvania tin plate producer notes a decided improvement in specifications against contracts. The local office of a large Pittsburgh producer reports tin plate mills beginning to-day operating at 90 per cent capacity; 75 per cent of the wire mills employed and all the furnaces in the pipe department active, but bars, shapes and structural mills still limping along at 30 to 40 per cent of capacity.

Pig Iron.—Sales of 10,000 to 12,000 tons of foundry iron have come to the surface. To-day the Thatcher company closed for 2500 tons. The Richardson & Boynton Co. has distributed orders for 5000 tons among four furnaces; two in eastern and two in central Pennsylvania. The prices obtained were \$20 to \$20.50 for No. 2X and \$19.50 to \$20 for No. 2 plain. The Central foundry bought about 1000 tons from two eastern Pennsylvania furnaces and is believed to have bought an additional 1000 from other producers. Another foundry has closed for about 1000 tons. Central Pennsylvania furnaces also received a share of the contract placed by the Saco Lowell shops. The remainder of the business went to Buffalo furnaces. There is a difference of opinion in regard to prices obtained on this latter tonnage, but it is understood to have been on the basis of \$18.50 Buffalo for No. 2 plain, although it is claimed that this price was shaded for some Massachusetts orders. A number of small orders for prompt shipment were taken by other eastern Pennsylvania furnaces, ranging from 100 to 500 tons each. Deliveries on the larger tonnages are to begin in February and extend over the second quarter of the year. In one case, delivery will extend into the third quarter. One sale of special gray forge iron amounting to 500 tons was made at \$19 furnace. The A. P. Smith Co. is now in the market for 800 tons of foundry grades and other small inquiries bring the total pending to between 3000 and 4000 tons. A cast iron pipe manufacturer may possibly be in the market to cover a recent contract for 5000 tons of gas pipe, but this interest made some large pig iron purchases early in December. The Westinghouse Electric & Mfg. Co. has an inquiry out for about 1000 tons including 700 tons of foundry grades and 300 tons of malleable and high silicon; the latter only 50 tons. A sale of Virginia iron high silicon—has been made at \$23.50 furnace, to be shipped from stock. This is equivalent to about \$20.50 for 1.75 to 2.25 silicon. Steel-making iron is dull. Most of the users of basic iron have covered their requirements and there is no inquiry in the market now for an appreciable tonnage. One sale of 600 tons of copper-bearing low phosphorus has been made at \$28 furnace, standard, copper free metal is neglected. The Eastern Steel Co. is seriously considering blowing out the Warwick furnace and the Colonial furnace will probably be idle on March 1 unless there is a decided change for the better in prices.

The Swale furnace No. 3 has been blown in preparatory to blowing out No. 2 speedily.

The following quotations are with the exception of those on low phosphorus iron for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton.

East. Pa. No. 2 plain	1.75 to 2.25 sil.	\$20.84 to \$21.26
East. Pa. No. 2X	" " to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain	1.75 to 2.25 sil.	22.24 to 22.74
Virginia No. 2X	2.25 to 2.75 sil.	27.74 to 28.24
Basic delivery eastern Pa.		19.81
Gray forge		20.50 to 21.50
Malleable		23.00 to 24.00
Standard low alloy (f.o.b. furnace)		30.00
Copper bearing low phosph. (f.o.b. furnace)		28.00

Billets.—Demand from home consumers is light. Re-rolling are still available at \$28 to \$29 and forging billets at \$32 to \$33, f. o. b. Pittsburgh. Some few sales have been made by Eastern mills on this basis. There is still some export inquiry in the market for

billets and sheet bars upon which domestic prices have been cut several dollars a ton.

Ferroalloys.—No improvement is noted in the demand, but several small sales have been made on a basis of \$58.35 seaboard. Spiegeleisen is quiet, but firm. Output is inconsiderable and stocks on furnace banks have been reduced. It is estimated that not more than 500 tons are available in the district, and this is nearly all low grade. Eighteen to 20 per cent alloy is quotable at \$25 to \$27 furnace.

Plates.—Manufacturers are more hopeful. Output is better. Specifications against contracts are larger. One manufacturer reports business taken in January as the largest since November, 1920. Orders taken from manufacturers of storage tanks and steel barrels are more encouraging. Several orders have also been received from shipbuilders for repair work, mainly for marine boilers. The outlook from a price standpoint leaves much to be desired by sellers, while one maker is or possibly two are obtaining 1.50c. base, Pittsburgh, for small lots, others are making sales at 1.40c. to 1.15c. base. This includes Pittsburgh as well as eastern Pennsylvania mills. The postponement of the interstate vehicular tunnel contract until Feb. 15 makes no change in the general situation. One order for 200 tons of plate for car repair work has been taken by a local mill at close to 1.40c. base. We quote plates 1.40c. to 1.50c. Pittsburgh.

Structural Material.—Bookings of orders for structural shapes have been at the expense of prices, although some mills are holding out strenuously for 1.50c. base. Some orders for plain material have been taken for 1.40c. to 1.45c., Pittsburgh. Fabricators have been the principal buyers. Among the prospective contracts in this territory are 2000 tons for the Curtis Publishing Co. building, 1500 tons for the Public Library and 1500 to 2000 tons for the Benjamin Franklin Hotel to be erected on the site of the Continental Hotel. Bethlehem fabricators recently secured an order for 500 tons of shapes for the Wesley Hotel, but this project now seems to be held in abeyance.

Rails.—The Southern Railway has ordered 8500 tons of 100-lb. rails for the Tennessee company but has postponed until spring the purchase of 26,000 of 85-lb. sections. The Western Maryland inquiry for 4000 tons is held in abeyance. The Baltimore & Ohio is still negotiating for 17,000 tons. The C. & O. inquiry for 26,000 tons includes 1000 tons for the Hocking Valley.

Bars.—A few more inquiries are in the market and some few additional sales have been made at 1.40c., base, Pittsburgh. Among the new inquiries in the market are 1500 tons of concrete bars for the Detroit reservoir. Inquiries are still pending on about 4000 tons. Bar iron makers quote 1.40c. to 1.45c. base, Pittsburgh.

Rivets.—An order for 500 tons of special quality rivets is understood to have been placed to-day by the Merchant Shipbuilding Co., Chester, at close to 2c. per lb. These are to be utilized in the manufacture of steel pipe for the New York aqueduct.

Warehouse Business.—Some slight improvement is reported in the placing of orders for black and galvanized sheets and for structural shapes. Prices are without essential change and are as follows for Philadelphia, delivered.

Soft steel bar and small shapes, 2.50c.; iron bars (except bands), 2.00c.; round edge iron, 2.80c.; round edge steel, iron bush 4 1/2 in., 2.90c.; round edge steel plamished, 3.70c.; tank steel plate, 3 1/2 in., 2.12 1/2; blue annealed steel sheets, No. 10 gauge, 2.00c.; light black sheets, No. 28 gauge 4c.; galvanized sheets, No. 28 gauge, 5c.; square twisted and deformed steel bars, 3/4 in. structural shape, 1.60c.; diamond pattern plates, 1 1/2 in., 4.60c.; 3 1/2 in., 1.78 1/2; 4.90c.; spring plate, 1 1/2 in., 4.60c.; 3 1/2 in., 1.78 1/2; 4.90c.; squares and hexagons cold rolled steel, 3.75c.; steel hoops, No. 13 gauge and lighter 3.25c.; steel bands, No. 12 gauge to 3/16 in., inclusive 2.10c.; iron bands 3.90c.; rails 2.75c.; reel steel, 8c.; Norway iron, 3c.; toe steel, 1.50c.

Coke.—Buying of furnace coke is confined within narrow limits, but the market remains firm at \$3.25. Connellsville. Foundry coke ranges from \$3.75 to \$4.50 at ovens according to quality, but the bulk of the sales are at \$4 to \$4.50, ovens.

Old Material.—Steel mills have bought additional lots of heavy steel melting scrap ranging from 1000 to 2000 tons each. Purchases previously made are a little larger than reported. Aggregate sales in the last two

weeks have been about 15,000 tons. Midvale is still buying at \$12.50 delivered, Nicetown, and \$11.50 delivered, Coatesville. The Bethlehem Steel Co. has bought at \$12 to \$12.50. Pencoyd has been buying at \$12. Alan Wood is bidding \$12 and the Worth Steel Co. is paying \$12, delivered. Cast iron-car wheels are quotable at \$15 to \$16. Steel car axles are nominal at \$17.50 to \$18.50. One Eastern mill is reported to be buying railroad steel at \$11.75. There is still considerable interest in the offering of 105,000 tons at the Hog Island shipyard by the Shipping Board. Bids will be received until noon, Feb. 15. We quote various grades of old material for delivery at consumers' works in this district as follows:

No. 1 heavy melting steel.....	\$12.00 to \$12.50
Scrap rail.....	12.00 to 12.50
Steel rails, re-rolling.....	13.00 to 13.50
No. 1 low phos. heavy 0.01 and under.....	18.00 to 19.00
Cast iron car wheels.....	15.00 to 15.50
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	13.00 to 12.50
No. 1 forge fire.....	10.00 to 10.50
Band sheets (for steel works).....	9.50 to 10.00
No. 1 busheling.....	11.00 to 12.00
No. 2 busheling.....	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use).....	9.25 to 10.25
Mixed borings and turnings (for blast furnace use).....	9.25 to 10.25
Machine-shop turnings (for rolling mill and steel works use).....	9.00 to 9.50
Heavy axle turnings (or equivalent).....	9.50 to 10.00
Cast borings (for steel works and rolling mills).....	12.00 to 12.50
Cut borings (for chemical plants).....	13.00 to 14.00
No. 1 cast.....	16.50 to 17.00
Railroad grate bars.....	14.00 to 14.50
Stove plate (for steel plant use).....	14.00 to 14.50
Railroad malleable.....	12.50 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications).....	12.00 to 12.50
Iron car axles.....	No market
Steel car axles.....	17.00 to 18.50

GERMANY NOT A COMPETITOR

German Prices as High or Higher Than American Japan Buys Wire, Nails and Sheets

NEW YORK, Feb. 7.—A slight improvement in the export situation seems evident, although business is still largely confined to Far Eastern buying and inquiring. Part, at least, of the present improved condition in export selling is probably caused by the better situation of American sellers on price. German competition in Far Eastern markets, which a few months ago threatened to become extremely serious, has gradually receded as Continental prices increased and exchange magnified the difference. To-day, German sellers, in the great majority of cases, are forced to quote f.o.b. Hamburg a price equivalent to, or higher than, the American quotations f.o.b. Pittsburgh. This is true of steel bars, structural material and plates, and on blue annealed sheets, wire nails and heavy gages of plain wire the German price is distinctly higher. A New York exporter who in November filled orders from customers in Japan for blue annealed sheets, placing them in Germany at an average price of \$40 per ton, found the price up to \$57 per ton in December and \$60 per ton and higher now, which brings the German quotation above the prevailing American price. German wire nails, which last summer and early in the fall of 1921 were considerably lower in price than the American product, are now from 25c. to 35c. per keg higher as a rule and difficult to obtain on early delivery.

The recent report, published in some papers, of a 15,000-ton rail order being placed by a Southern railroad with the Hugo Stinnes interests and later canceled is without substantial foundation.

Bids have been opened in Japan on the inquiry of the South Manchuria Railway Co. for between 6000 and 7000 tons of heavy rails. Quotations of American mills are reported to have been \$47 per ton, c.i.f., Dairen, in one instance, and about \$46.25 per ton in another. Several other fair-sized contracts for various kinds of material for Japan are still pending. For example, the Imperial Government Railways of Japan are in the market for 10,000 tons of 60-lb. rails.

America lost 12,000 tons of rails for Brazil to Belgium. American plate makers fear that they cannot get an attractive plate order from India largely because of the high ocean freights. At the present time it is found difficult to compete with Europe on the heavy tonnage products.

British Iron and Steel Market

Pig Iron Quieter—Steel Business Slack—Coke a Trifle Higher—Pig Iron and Tin Plate Lower—Exchange Much Firmer
(By Cable)

LONDON, ENGLAND, Feb. 7.

As consumers are apparently satisfied with respect to their urgent demands, the pig iron market is quieter. Scotland is still receiving iron of Continental make under old contracts. Germany is taking fair quantities of Cleveland pig iron.

Hematite is weak. Mixed numbers are being sold at £4 10s. (\$19.53). The home trade is generally inactive, but export demand is improving.

Bilbao Rubio is now sold at 25½s. (\$5.53) ex-ship Tees. Scotland has purchased some French ore at 20s. (\$4.34) ex-ship Tees.

Scotch Durham coke is firmer, on Continental demand.

English steel makers are resuming operations, fixing minimum home quotations on ship plates at £10 10s. (2.03c. per lb.); on sections at £10 (1.94c. per lb.) basis, delivered. Business generally is slack. Wages of North-eastern Coast workers have been reduced 33½ per cent; of Midlands workers, 20 per cent.

Clyde shipbuilding for January consisted of eight vessels launched, amounting to 52,062 gross tons register.

Belgian merchants have sold merchant bars at £8 9s. (1.64c. per lb.); rods at £9 17½s. (1.91c. per lb.); both c.i.f., India. French merchant bars are sold at £8 5s. to £8 10s. (1.60 to 1.65c. per lb.) f.o.b., for April and May delivery. Belgian structural steel is held at £7 7½s. to £7 10s. (1.43 to 1.45c. per lb.) f.o.b. Luxembourg beams are quoted at £7 10s. to £7 15s. (1.45 to

1.50c. per lb.) f.o.b., for April and May shipment. Belgian wire rods are held at £8 15s. to £9 (\$37.98 to \$39.06) f.o.b., for April and May delivery.

German plates are priced at £8 5s. (1.60c. per lb.) f.o.b. for April and May shipment. German merchants are quoting wire rods (country of origin not specified) at £8 17½s. (\$38.52) f.o.b.

Continental foundry pig iron is priced at £5 (\$21.70) per ton.

Tin plate is easier on acceptance by the works of low bids offered by merchants covering orders. March delivery has sold at 18½s. (\$4.07) f.o.b. A substantial oil order has been placed at a cheap price. Wasters are easier, sellers of 20 x 14-in. asking 18½s. (\$4.01) f.o.b.

Merchants have sold, to Indian specifications, black sheets at £12 10s. to £13 15s. (2.42 to 2.66c. per lb.) c.i.f. Japanese specifications have been done at £16 (3.10c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.34 per £1 as follows:

Durham coke delivered	11 5s. to 11 15s.	\$5.64 to \$5.88
Cleveland No. 1 foundry	1 11	26.62
Cleveland No. 2 foundry	1 10	19.53
Cleveland No. 1 foundry	1 11	18.99
Cleveland No. 1 forge	1 10	19.53
Cleveland basic	1 10	19.53
Hematite	7 0*	30.38*
East Coast mixed	1 10	19.53 to 20.07
Perronmanganose	15 0	65.10 & 62.92*
Rails, 60 lb. and up.	8 0	34.72 to 41.23
Billets	7 0	30.38 to 32.55
Sheet and tin plate, base		
Weld	1 11	31.47 to 32.01
Tin plates, base, f.o.b.	0 15 1/2 to 0 19 1/2	4.07 to 4.18
C per lb.		
Ship plates	0 0	1.74 to 2.03
Boiler plates	1 10	2.42 to 2.71
Tees	1 10	1.84 to 2.13
Channels	8 11	1.70 to 1.99
Beams	8 5	1.60 to 1.94
Round bars, 3/4 to 1 in.	10 10	2.04
Galvanized rods, 1 1/2 in.	1 11 1/2	3.03 to 3.10
Black sheets	12 1/2	2.17 to 2.52
Steel hoops	12 0	2.32 & 2.37*
Cold rolled steel strip, 20 g.	24 0	4.10

*Export price.

Continental Pig Iron Eliminated Steel Prices Now Competing with Continent Low Output of Ships

LONDON, ENGLAND, Jan. 25.—Conditions continue to improve, though the recovery is only gradual. The reducing of Cleveland pig iron to a basis price of 90s. has considerably augmented the demand, and consumers, finding that hopes of any further concessions are improbable for some time, have once more started to buy. The result has been that makers have been enabled to get more furnaces going, thus helping to relieve the unemployment and also to reduce standing charges. Scotland, an important consumer of Cleveland pig iron, is able to buy fairly well now, as the steamer freight rates have been reduced, while export markets are showing a good deal more interest and of late sales have been made to Scandinavia and also to Germany. Continental pig iron is quite out of the running, not only on account of the uncertainty of shipments, but British pig iron is considerably cheaper than continental, few makers of the latter offering foundry iron at less than 100s. f.o.b.

The recovery in the hematite iron trade is not so rapid as in the foundry. There is a certain demand which has enabled makers to re-light additional furnaces but the business moving is not sufficient to stabilize values. Makers are very keen for orders that are about and are ready to grant concessions, with the result that East Coast mixed numbers are now freely obtainable at 95s.

In finished iron and steel, inquiry increases, mostly for export, and a fair amount of business is being done but works in general are only partly employed. Makers, however, are somewhat stiffer in their price attitude, maintaining that to sell at anything below the official minimum quotations is a loss, and therefore they are not keen to cut values further. One of the main hindrances to the developments of the home trade

are, of course, the large costs still involved in transport and in the general manufacturing costs to the consumers in working up material to the finished article.

It is encouraging to see that the volume of business going to continental works is decreasing as British prices more nearly approach those of the continent, or rather as the continental prices go up. There seems to be no relief in respect of shipments from that side, which are greatly in arrears, due, it is stated, almost entirely to the acute shortage of fuel.

Shipbuilding is still in a bad way as will be seen by the following notes from Lloyds Register. The merchant tonnage in construction in the United Kingdom for the quarter ended Dec. 31 was 2,640,319 tons while the total gross tonnage launched during the year was 1,538,052 tons, representing a reduction of over 500,000 tons compared with 1920, which was a record year, and over 300,000 tons less than the tonnage launched in 1913. The world's total shipbuilding output for 1921 is given at 4,341,679 tons, being a decrease of about 1,500,000 tons over 1920. The largest vessel launched in this country was the "Laconia" for the Cunard Line, of 19,730 tons. The Clyde production for the last year declined by over 175,000 tons while the Wear output was over 170,000 tons less than in 1920. The following figures represent the shipbuilding output for 1921 of the various countries as stated: United Kingdom, 1,538,052 tons; United States, 1,006,413 tons; Germany, 509,064 tons; Holland, 232,402 tons; Japan, 227,425 tons; France, 210,633 tons; and Italy, 164,748 tons.

The Erie Foundry Co., Erie, Pa., recently shipped one of its new improved type sheet galvanizing plants to the Empire Rolling Mill Co., Cleveland. Two of these galvanizing units have been ordered by the Otis Steel Co., Cleveland, for installation at its Riverside Works, and will be shipped shortly.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Strait		Lead		Zinc	
	Lake	Electro-	New York	St. Louis	New York	St. Louis	New York	St. Louis
Feb. 1	13.60	13.75	31.75	4.70	4.40	4.85	4.50	
2	13.50	13.75	31.75	4.70	4.40	4.85	4.50	
3	13.50	13.75	31.75	4.70	4.40	4.85	4.50	
4	13.50	13.75	31.75	4.70	4.40	4.85	4.50	
5	13.50	13.75	31.75	4.70	4.40	4.85	4.50	
6	13.50	13.75	31.75	4.70	4.40	4.85	4.50	
7	13.50	13.75	31.75	4.70	4.40	4.85	4.50	

*It covers quotations.

New York

NEW YORK, Feb. 7.

Conditions in all the markets are changed but slightly. Demand for copper and zinc continues very light with prices lower for copper. The lead market is the strongest of all and there has been some moderate activity in tin, prices in both markets being steady.

Copper.—One of those periods of seasonable dullness, which frequently characterize the copper market, has prevailed for some weeks and there is very little demand either from domestic or foreign consumers. Electrolytic copper is available from some of the large producers at 13.75c., delivered, as contrasted with 13.87½c. and 14c. a week ago and from small producers it can be bought at 13.50c., delivered, or 13.25c., refinery, which is the prevailing level at which business is being done. From a few dealers and speculators small lots are reported obtainable as low as 13.37½c., delivered, but such cases are few. The principal cause of the light demand is the heavy buying in the last quarter of last year and also an expectation on the part of some consumers that the starting up of the copper mines will increase supplies of refined copper. Lake copper, in sympathy with electrolytic, is slightly lower.

Tin.—In the past week, Feb. 3 and 4 were the most active days, but as a whole the market has been quiet. Previous to those days there were sellers who held firmly at quotations which were sufficiently higher than buyers' prices at all times so that a deadlock resulted and the market was stagnant. On one of the two days referred to, or Feb. 3, dealers were the principal buyers and about 200 tons of forward tin was sold, mostly at 30.75c. to 30.87½c. On Feb. 4 a large independent tin plate maker inquired for liberal amounts with the result that some orders for future delivery were placed at 31c. to 31.12½c. Yesterday and to day have been very quiet with the quotation for spot Straits to-day at 32c., New York. The London market for spot standard tin to day was £155 15s., future standard at £157 15s., and spot Straits £158 5s., all about £3 to £4 per ton less than a week ago. Deliveries into consumption in January are reported to have been 4275 tons, with metal in stocks and landing on Jan. 31 at 1331 tons. Imports for the month were 3910 tons, against 1245 tons in January, 1921. Arrivals thus far this month have been 615 tons, with 8160 tons reported afloat.

Lead. Prices are unchanged and demand continues steady. The leading interest continues to quote 4.70c., New York and St. Louis, while from the independents the metal can be bought at no less than 4.40c., St. Louis, or 4.70c. to 4.75c., New York and Eastern points.

Zinc.—After declining almost daily for several weeks the market for prime Western zinc may be characterized as firmer, in that quotations have remained steady for a week at 4.50c., St. Louis, or 4.85c., New York, which is the quotation for early delivery. There is some disposition to quote futures on the same basis, but this is not general. Demand does not improve and is only of the hand-to-mouth order.

Antimony.—Wholesale lots for early delivery are unchanged in a quiet market at 4.40c. per lb., New York, duty paid.

Aluminum.—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 19c. to 19.10c. per lb., f.o.b. plant, depending on the quantity. The same grade through importers is obtainable at 17c. to 18c., New York, duty paid.

Old Metals.—The market is very depressed with values slightly lower. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.00
Copper, light and bottoms	9.25
Heavy machine composition	10.00
Brass, heavy	7.75
Brass, light	5.75
No. 1 red brass or composition turnings	8.00
No. 1 yellow red brass turnings	6.00
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

FEB. 7.—Tin is stronger and while a little business has been closed in this metal, the situation is still far from satisfactory. Inquiry for copper has improved slightly but, on the whole, this metal is weaker and declines are looked for. Lead, zinc and antimony are quiet. In the old metals copper wire, crucible shapes and clips have declined while yellow brass has advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 33c. to 33.50c.; lead, 4.50c.; spelter, 4.60c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

President Orders Naval Work Stopped

WASHINGTON, Feb. 7.—One of the immediate effects of the Conference on Limitation of Armaments, which came to an end here yesterday, was an order by the President suspending work at once on all naval vessels it is proposed to scrap and also to discontinue work on fortifications in Guam and the Philippine Islands. Announcement of the suspension of this work was made to-day at the White House. It was stated, however, that no permanent discontinuance of the work will be ordered unless and until the Senate ratifies treaties drawn up by the conference. Meanwhile contracts for steel for ships to be scrapped and for fortifications are being held up and if ratification of treaties as proposed is made, the contracts will be canceled, it is understood, and necessary adjustments made.

Mr. Dupuy Sues Crucible Steel Co. of America

PITTSBURGH, Feb. 7.—Herbert Dupuy, former chairman Crucible Steel Co. of America, has entered suit against the company in United States District Court here for \$162,048, to reimburse him for expenses incurred by him as a result of defending himself on charges brought by the Government alleging conspiracy to defraud the Government in connection with Federal income tax returns. Mr. Dupuy was acquitted. He claims that the expenses were entirely the result of acts done by him as an officer of the company and in the interests of the company, and that the company has refused to reimburse him.

Recent boiler developments are to be discussed at a meeting to be held jointly on the evening of Feb. 15 by the New York section of the American Society of Mechanical Engineers and the Stevens Engineering Society at Stevens Institute of Technology, Hoboken, N. J. The chief speaker will be V. Z. Caracristi, consulting engineer, New York, who will consider particularly the 2640 hp. Ladd boilers at the River Rouge plant of the Ford Motor Co.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	\$0.36	Kansas City	\$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.565
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.175		

The minimum carload to most of the foregoing points is 35,000 lb. To Denver the minimum loading is 10,000 lb. while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 50,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 40,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, cast, ship plates, cast, ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 7c; sheets and tin plates, 6c to 7c; rods, wire rope, cable and strands, 41c; wire fencing, netting and stretcher, 7c; pipe not over 8 in. in diameter, 7c; over 8 in. in diameter, 24c per in. of traction thereof additional. All prices per 100 lb. in carload lots, minimum 10,000 lb.

Structural Material

I beams, 3 to 15 in. channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, 1/2 in. thick and over, and zees, structural sizes, 1.40c to 1.50c.

Sheared plates, 1/2 in. and heavier, tank quality, 1.50c.

Wire Products

Wire nails, \$2.50 base per keg, galvanized 1 in. and longer, including large-headed barbed roofing nails, taking an advance over that price of \$1.25 and short 1 in., \$1.75; bright Bessemer and base wire, \$2.25 per 100 lb.; galvanized fence wire, Nos. 6 to 8, \$2.25; galvanized wire, \$2.75; galvanized barbed wire \$3.15; galvanized fence staples, \$3.15; painted barbed wire \$2.65; polished fence staples, \$2.65; cement coated nails, per count keg \$2.00, these wires being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 65 to 70 1/2 per cent off list for carload lots; 67 to 69 1/2 per cent for 1000-rod lots, and 65 to 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7 1/2 per cent off list

Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list

Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list

Carrage bolts, 3/4 in. x 6 in. 65, 10 and 10 per cent off list

Smaller and shorter rolled threads, 65, 10 and 10 per cent off list

Cut threads, 65, 10 and 10 per cent off list

Longer and larger sizes, 65 and 10 to 70 per cent off list

Lag bolts, 70 and 10 to 70, 10 and 5 per cent off list

Flow bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list

Other style heads, 20 per cent extra

Machine bolts, c.p.c. and nuts, 3/4 in. x 4 in., 65 and 10 per cent off list

Smaller and shorter, 65 and 10 per cent off list

Larger and longer sizes, 65 and 10 per cent off list

Hot pressed sq. or hex. blank nuts, \$5.50 off list

Hot pressed nuts, tapped, \$5.00 to \$5.25 off list

C.p.c. and 1 sq. or hex. blank nuts, \$5.25 off list

C.p.c. and 1 sq. or hex. blank nuts, tapped, \$5.00 off list

Semi-finished hex. nuts, 3/4 in. to 2 1/16 in. inclusive, \$6.10 and 10 per cent off list

Small sizes S. A. E., \$8.10, 10 and 10 per cent off list

% in. to 1 in. inclusive, 17 S. S. and S. A. E., 70, 10, 10 and 10 per cent off list

Stove bolts in packages, 80, 10 and 10 per cent off list

Stove bolts in bulk, 80, 10 and 7 1/2 per cent off list

Tire bolts, 65, 10 and 10 per cent off list

Track bolts, carloads, 3c to 3 25c base

Track bolts, less than carloads, 1c to 1 1/2 c

Upset and Hex. Head Cap Screws

3/8 in. and under, 80 and 10 to 80, 10 and 10 per cent off list

9/16 in. to 3/4 in., 80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

3/8 in. and under, 80, 10 and 5 to 85 per cent off list

9/16 in. to 3/4 in., 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 to 80 per cent off list

Milled Set Screws

All sizes, 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets, \$2.35

Large boiler rivets, 2.35

Small rivets, 10, 10 and 10 to 70, 10 and 5 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$37; chain rods, \$36 to \$37; screw stock rods, \$41 to \$42; rivet and bolt rods and other rods of that character, \$36 to \$37, high carbon rods, \$42 to \$43, depending on carbon.

Railroad Spikes and Track Bolts

Railroad spikes, 9 1/4 in. and larger, \$2.15 to \$2.20 base per 100 lb. in lots of 200 kgs of 200 lb. each or more; spikes, 1/2-in., 5/8 in. and 7 1/8 in., \$2.25 to \$2.30 base, 5/16-in., \$2.35 to \$2.40 base. Boat and bridge spikes, \$2.25 to \$2.30 base per 100 lb. in carload lots of 200 kgs or more, f.o.b. Pittsburgh. Track bolts, 3c to 3 25c base per 100 lb. Tie plates, \$2 per 100 lb. Anchor bars, \$2.10 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8 lb. coating, 200 lb., \$9.30 per package; 8 lb. coating, 1 c., \$9.60; 15-lb. coating, 1 c., \$11.80; 20-lb. coating, 1 c., \$13.25-lb. coating, 1 c., \$14.70; 30-lb. coating, 1 c., \$15.25; 35-lb. coating, 1 c., \$16.25; 40-lb. coating, 1 c., \$17.25; per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bar, 1 1/2 in. to 1 1/2 in. from 1/2 in. Rolled bar iron, 2c. to 2 1/2 c.

Welded Pipe

The following discounts are allowed on carload lots on all Pittsburgh orders:

Inches	Steel		Iron	
	Black	Galv.	Black	Galv.
1 to 2	4 1/2	38 1/2	3 1/2	22 1/2
2 to 3	6	33 1/2	3 1/2	18 1/2
3 to 4	6 1/2	30 1/2	3 1/2	17 1/2
4 to 5	6 1/2	28 1/2	3 1/2	16 1/2
5 to 6	6 1/2	26 1/2	3 1/2	15 1/2
6 to 8	6 1/2	24 1/2	3 1/2	14 1/2
8 to 10	6 1/2	22 1/2	3 1/2	13 1/2

Steel		Iron	
Black	Galv.	Black	Galv.
1 to 2	4 1/2	3 1/2	22 1/2
2 to 3	6	3 1/2	18 1/2
3 to 4	6 1/2	3 1/2	17 1/2
4 to 5	6 1/2	3 1/2	16 1/2
5 to 6	6 1/2	3 1/2	15 1/2
6 to 8	6 1/2	3 1/2	14 1/2
8 to 10	6 1/2	3 1/2	13 1/2

Steel		Iron	
Black	Galv.	Black	Galv.
1 to 2	4 1/2	3 1/2	22 1/2
2 to 3	6	3 1/2	18 1/2
3 to 4	6 1/2	3 1/2	17 1/2
4 to 5	6 1/2	3 1/2	16 1/2
5 to 6	6 1/2	3 1/2	15 1/2
6 to 8	6 1/2	3 1/2	14 1/2
8 to 10	6 1/2	3 1/2	13 1/2

Steel		Iron	
Black	Galv.	Black	Galv.
1 to 2	4 1/2	3 1/2	22 1/2
2 to 3	6	3 1/2	18 1/2
3 to 4	6 1/2	3 1/2	17 1/2
4 to 5	6 1/2	3 1/2	16 1/2
5 to 6	6 1/2	3 1/2	15 1/2
6 to 8	6 1/2	3 1/2	14 1/2
8 to 10	6 1/2	3 1/2	13 1/2

Steel		Iron	
Black	Galv.	Black	Galv.
1 to 2	4 1/2	3 1/2	22 1/2
2 to 3	6	3 1/2	18 1/2
3 to 4	6 1/2	3 1/2	17 1/2
4 to 5	6 1/2	3 1/2	16 1/2
5 to 6	6 1/2	3 1/2	15 1/2
6 to 8	6 1/2	3 1/2	14 1/2
8 to 10	6 1/2	3 1/2	13 1/2

To the 30th of the month, the above discounts are increased by one cent with supplementary discounts of 5 and 10 per cent.

Boiler Tubes

The following are the discounts on carload lots f.o.b. Pittsburgh:

Welded Steel		Chamfered Iron	
Black	Galv.	Black	Galv.
1 1/2 in. to 2 in.	26 1/2	1 1/2 in. to 2 in.	5
2 in. to 2 1/2 in.	41	2 in. to 2 1/2 in.	15
2 1/2 in. to 3 in.	52	2 1/2 in. to 3 in.	25
3 in. to 3 1/2 in.	57	3 in. to 3 1/2 in.	30
3 1/2 in. to 4 in.	62	3 1/2 in. to 4 in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads f.o.b. Pittsburgh follow:

Blue Annealed		Cents per Lb.	
No. 8 and heavier	No. 11 and 12	No. 13 and 14	No. 15 and 16
2.20	2.30	2.35	2.45
2.25	2.35	2.40	2.50

Hot Annealed One Pass Cold Rolled		Cents per Lb.	
No. 17 to 21	No. 22 to 26	No. 28 (base)	No. 29
2.80	2.85	3.00	3.10
2.85	2.90	3.10	3.20
2.90	2.95	3.20	3.30

Galvanized		Cents per Lb.	
No. 10 and 11	No. 12 and 13	No. 14 (base)	No. 15
3.00	3.10	3.20	3.30
3.10	3.20	3.30	3.40
3.20	3.30	3.40	3.50

Tin Mill Black Plate		Cents per Lb.	
No. 15 and 16	No. 17 to 21	No. 22 to 26	No. 28 (base)
2.80	2.85	2.90	3.00
2.85	2.90	2.95	3.05
2.90	2.95	3.00	3.10

PERSONAL

S. W. Wheelock has been made manager of sales in St. Louis for Carnegie Steel Co., Illinois Steel Co. and Tennessee Coal, Iron & Railroad Co., to succeed



S. W. WHEELLOCK

W. W. Scott, Jr. who has become general manager of sales for Laclede Steel Co., St. Louis. Mr. Wheelock was manager of sales for the same companies at New Orleans, and he has been succeeded there by Dennis Crowley, Jr., who has been assistant manager of sales at St. Louis, and he in turn, has been succeeded by W. W. Aipe who has been in the St. Louis office for several years. Mr. Wheelock has been engaged in the steel trade since 1893, when he entered the service of the Pittsburgh Tool Steel Co. He was with Park Brothers & Co. from 1893 to 1899, when he went with the Illinois Steel Co. He went with the United States Steel Corporation when it was organized in 1901, and from that year until 1907 was in charge of its Denver office. He was assistant manager of sales at St. Louis from 1907 to 1914, when he was transferred to New Orleans as manager. Mr. Wheelock is a member of the American Iron and Steel Institute.

Chas. E. Sanders has resigned as general purchasing agent of the Emerson Brantingham Co., manufacturer of farm machinery, Rockford, Ill., effective March 1. After that date he will be associated with his son Raymond Y. Sanders, in the insurance business at 209 South La Salle Street, Chicago.

At the annual meeting of the stockholders of the Inland Steel Co., Chicago, on Jan. 1, former directors were re-elected and Gordon Battelle, Columbus, Ohio, was elected director to succeed Elias Colbert, deceased. L. E. Block and P. D. Block were re-elected chairman of the board and president respectively. Edward M. Adams was elected first vice president to succeed G. H. Jones and W. D. Innesdale was elected secretary-treasurer. Other vice presidents are H. C. Jones, E. J. Block, J. W. Lees, W. C. Carroll and Charles R. Robinson, the latter two having recently become affiliated with the company, as previously announced in these columns.

H. W. Wendt, president of the Buffalo Forge Co., Buffalo Steam Pump Co., Geo. I. Squire Mfg. Co. and Canadian Blower & Forge Co., is on a business trip to South America. Mr. Wendt will visit the principal business centers of South America and expects to be away about four months.

Evan I. Jones, Morgan Construction Co., Worcester, Mass., sails Feb. 14 on the George Washington for a 64 days' trip to the Holy Land and other points of interest.

Frederick G. Hughes, general manager, New Departure Mfg. Co., Bristol, Conn., bill bearings, etc., has been made vice president of that organization and Lester G. Signourney, sales department secretary. A. P. Sloan, Jr., vice president, and John I. Pratt, general manager accessories division General Motors Corporation have been made New Departure directors.

H. H. Iasnacht, formerly connected with the Shafer Roller Bearing Co., Chicago, has been placed in charge of the engineering sales department of the newly incorporated L. C. Smith Bearings Co., Chicago.

Dr. Eugene Hart, of St. Johns, Mich., was recently elected president of the Triangle Motor Truck Co., that

city. F. C. Burk was made treasurer and general manager.

Arthur X. Merz, secretary Madison-Kipp Co., Madison, Wis., sailed Feb. 4 on the Empress of Scotland for a tour of the Mediterranean sea. He will then seek admission to Russia to investigate possibilities of business. The Madison-Kipp Co. is a large producer of automatic lubricating devices for tractors, etc.

A. J. McFarland, general manager, Portsmouth, Ohio works, Wheeling Steel Corporation, has been transferred to the Steubenville, Ohio, works of the company and will assume the position of general manager made vacant by the resignation of G. B. LeVan. G. W. Moore, general superintendent, Portsmouth works, has been promoted to the position of general manager, vice Mr. McFarland.

Carl C. Brown has been appointed vice president and general sales manager of the Nichols Wire & Sheet Co., headquarters Kansas City, Mo. The Nichols company also operate warehouses at Tulsa, Okla., Ft. Scott, Kan., Joplin, Mo., Davenport, Iowa, and Pittsburgh. Mr. Brown was formerly general sales agent of the Gulf States Steel Co., Birmingham, Ala. He is succeeded at Birmingham by Chas. E. Paddock, former sales representative of the company in the southwest, with headquarters at Oklahoma City.

The Gulf States Steel Co. appointed J. H. Bryan sales agent, with office at 50 Church Street, New York.

William Metcalf, Jr., former president and owner of the Bracburn Steel Co., has been nominated as an alumni trustee of Cornell University, from which he was graduated in 1901.

Edward Van Winkle, who has been associated with F. A. Waldron, as consulting industrial engineer, has re-established himself in the independent practice of patent and trade mark law at 37 Wall Street, New York.

Ired W. Ramsey has resigned the presidency of the Cleveland Metal Products Co., Cleveland, in order to devote more of his time to civic and philanthropic activities. His resignation was accepted at the annual meeting and L. S. Chadwick, who was engineer of the company for nine years and has recently been vice president in charge of manufacturing, was elected in his place. Mr. Ramsey will continue as a director of the company and will devote part of his time to its affairs. He was manager of the recent Community Chest Campaign in Cleveland and has accepted the chairmanship of the Campaign Committee for the next year.

W. I. Jolley, formerly connected with the Troy Wagon Works Co. and later with the Miami Trailer Co., Troy, Ohio, has been appointed by the Holt Mfg. Co., Peoria, Ill., manager of its London office and will have charge of sales of the company's line of tractors in Europe and Africa.

S. S. Chapin has been chosen as secretary and purchasing agent of the American Fork & Hoe Co., Cleveland, succeeding E. D. Lowell, who died recently. Mr. Chapin had been for some time Mr. Lowell's assistant and as such had general charge of the purchasing.

Lincoln Motor Co., Taken Over by Fords

The Lincoln Motor Co., Detroit, was sold at receiver's sale last Saturday, the purchasers being Henry and Edsel Ford, who bid \$8,000,000. It is announced that the Lincoln plant will operate immediately with a force of 600 men and production will be speeded. Reductions of from \$800 to \$1200 will be made in the price of cars. The Lincoln plant will continue to be managed by Henry M. and Wilfred C. Leland.

At the eighteenth annual meeting of the Associated Employers of Indianapolis, Inc., Feb. 16, addresses will be delivered by Walter Drew, New York, counsel National Erectors' Association, and Earl J. McGee, general manager of the Buffalo Commercial "Building and the Public" will be discussed by Mr. Drew and Mr. Sick Friend, Mr. Ito, will be Mr. McGee.

OBITUARY

CHARLES LEWIS TAYLOR, partner of Andrew Carnegie and head of the Carnegie Hero Fund Commission since its creation by Mr. Carnegie in 1904, died at his



CHARLES L. TAYLOR

winter home in Santa Barbara, Cal., Feb. 3. He had been in failing health since last September. He retired from active participation in the iron and steel industry in 1901, with the absorption of the Carnegie Steel Co. by the United States Steel Corporation, at which time he occupied the position of assistant to the president. During the preceding 25 years, Mr. Taylor had an active place in the industry and it is said of him that probably no single individual connected with the steel industry between 1880 and 1890 did more in the practical direction of supplanting wrought iron with soft steel than he

did. His thorough knowledge of chemistry and the metallurgy of steel enabled him while superintendent of the Homestead Steel Works to be probably the first one to successfully produce soft steel for manufacture of pipe, nails, ship plate and structural steel. His early connection with the designing as well as the manufacture of steel suitable for steel car construction, was one of his principal achievements, representing pioneer work of an original character and a comprehensive foresight into the requirements of the steel business. Since his retirement from active business, Mr. Taylor had devoted his time principally to philanthropic work, partly of a personal nature and partly in behalf of the pension and relief organizations in which he was associated. He was first chairman of the Carnegie Pension Fund, which now is administered as the United States Steel and the Carnegie Pension Fund. He was born in Philadelphia, April 3, 1857, a son of John D. Taylor, treasurer of Pennsylvania Railroad Co. from 1874 to 1886. He was graduated from Lehigh University in 1876 with the degree of mechanical engineer and immediately after graduation became assistant chemist at the works of the Cambria Iron Co., Johnstown, Pa. He subsequently became assistant superintendent of blast furnaces at that plant. He went to Pittsburgh in 1880 to become chemist for the Pittsburgh Bessemer Steel Co., and in 1882 became superintendent of the company, retaining this position until the company was merged into the Carnegie interests. From 1883 until 1887 he was superintendent of the Homestead Steel Works, his successor being Charles M. Schwab, now chairman of Bethlehem Steel Corporation. The next two years he was general manager of Hartman Steel Co., another Carnegie plant, and from 1890 to 1892 he was assistant secretary of Carnegie, Phipps & Co., Ltd. In 1895 he was made assistant to the president, Carnegie Steel Co., with general supervision over the operations of all works, holding this position until his retirement in 1901.

ARTHUR BOSTWICK, president and one of the founders of the International Nickel Co., died at his home in Lawrence Park, West Bronxville, N. Y., Feb. 4. He was 48 years old and for a number of years resided in Pittsburgh, going to that city in 1898, following his graduation from the Columbia University School of Metallurgy, to become metallurgist at the Homestead works of the Carnegie Steel Co. In 1903 he became chief metallurgist of that company. A few years later, in association with Ambrose Monell and E. T. Wood,

he helped in the organization of the International Nickel Co., becoming assistant to Mr. Monell, the president, in 1911 and advancing to the presidency in 1912. He was a member of the American Society for Testing Materials, the American Society of Mining and Metallurgical Engineers and the American Iron and Steel Institute.

ARTHUR L. OVER, secretary of the Columbia Steel & Shafting Co., Pittsburgh, since its inception in 1896, died at his home in Ben Avon, Pa., Feb. 5, following a brief illness. He was 46 years old and was graduated from the University of Pittsburgh, in both the academic and law departments, completing the latter course in 1897. He was admitted to the Allegheny County bar that year and had practiced law since, beside attending to his business connections.

EPHRAIM TRUSALL, at one time manager of the Sligo rolling mills of Phillips, Nimick & Co., Pittsburgh, and of the Wheatland Iron Mills, Wheatland, Pa., died at his home in Pittsburgh Feb. 3. He was born in Westmoreland County, Pa., 70 years ago.

ALBERT R. WARNER, a director of the White Co., Cleveland, and secretary and treasurer of that company until his retirement from active business life several months ago, died Jan. 26, aged 54 years. His death resulted from a stroke of paralysis.

COLGATE HOYT, of Colgate Hoyt & Co., New York bankers, who died Jan. 30, was quite prominently identified with the Great Lakes shipping industry years ago before he moved from Cleveland to New York. He was associated with Alexander MacDougall, Duluth, in building and operating the type of boats known as whalebacks used for a number of years in the ore carrying trade. He was a brother of the late James H. Hoyt, a prominent Cleveland attorney who represented large lake vessel and iron and steel interests.

AARON B. HILER, for the past 15 years sales representative in the East and a part of the South for the Jones & Lamson Machine Co., Springfield, Vt., died on Jan. 29 at his home, 235 North Center Street, Orange, N. J. The funeral was held Monday evening and burial took place at Rockaway, N. J. Mr. Hiler was one of the best known machine-tool salesmen in the country. For some years he had been in poor health, but until a few weeks ago was active in his occupation.

MOSES MOSLER, aged 71 years, president of the Mosler Safe Co., Hamilton, Ohio, died at Grand Canyon, Arizona, on Jan. 19, while en route to the Pacific Coast on a pleasure trip. Mr. Mosler was the last of five brothers who were prominent in the business and professional life of Cincinnati. The Mosler Safe Works, of which he was the head, is the largest of the kind in the world, and employs more than 1000 persons. He is survived by his wife and one daughter, Mrs. E. C. Hyman, wife of the vice-president and treasurer of the company.

ALBERT C. ASHTON, treasurer Ashton Valve Co., Cambridge, Mass., died recently at St. Petersburg, Fla. He was born in England 52 years ago, but educated in this country, being a graduate of the Massachusetts Institute of Technology. Mr. Ashton was affiliated with many societies, including the American Society of Mechanical Engineers.

ARTHUR LEWIS, general sales manager the Great Western Smelting & Refining Co., Chicago, committed suicide at the home of his brother in Seattle, Wash., on Feb. 3. Mr. Lewis, who was 38 years of age, had suffered a nervous break-down.

The following production figures for December, 1921, in metric tons, have been issued by the Belgian Mining Administration, according to Acting Commercial Attaché S. H. Cross, of Brussels: Pig iron, 74,150; raw steel, 60,900; rough steel castings, 360; finished steel, 78,120; finished iron, 16,560; spelter, 7,370; coal, 1,995,350.

Machinery Markets and News of the Works

IMPROVEMENT CONTINUES

Activity in Small Tools Believed to Portend Sales of Heavier Equipment

Some Fair Sized Lists and Numerous Single Machine Inquiries Reported

In almost every quarter, the trend toward improvement in machine-tool inquiries and sales has been sustained. Settlement of the political situation in the Far East is expected to result in an increase of exports. There is a prevalence of small tool orders in practically all markets, which is believed to portend purchases of heavier equipment. One company in the New England district reports January sales of small tools as larger than at any time during the previous six months.

One of the districts showing the greatest activity is Cleveland, where several manufacturers have come into the market for automatic screw machines, the largest reported calling for between 60 and 75 machines. Other inquiries in this market include planers, turret lathes, vertical boring machine, and equipment for motor-valve stem manufacturer. For the first time in months inquiry is reported from the Akron, Ohio, rubber industry. Some manufacturers, who recently had surplus machinery for sale, have withdrawn offers, in view of the improved outlook. One manufacturer of automatic screw machinery has reduced prices about 25 per cent.

Numerous orders are reported by Cincinnati builders, shapers, grinding machines of special type, boring mills, planers, engine lathes and drilling machines be-

ing included. Inquiries for single machines are numerous and a fair percentage is developing into orders. The Hocking Valley Railroad Co. has issued a list calling for seven heavy-duty tools.

Although bookings in the New England district have been light, there is considerable optimism as to future purchases, which, it is believed, cannot be delayed much longer. Inquiry at present seems to be confined largely to used equipment. Negotiations are in progress for the purchase of 20 lathes, ranging in size up to 36-in. One of the largest active inquiries calls for 16 lathes, two planers, two drilling machines, a milling machine, shaper, floor-boring equipment, wet tool grinder and key-seater. Other prospective closings are on pipe machines, punches and shears, and numerous small tools. There is some activity in abrasive wheels.

Less activity was evident in the Pittsburgh district, although sales were slightly better than at any time in January. Some fair sized orders are noted. The Wheeling Steel Corporation is asking for 20 tools for its Portsmouth, Ohio, plant; another list is expected for Steubenville, Ohio. Buying is evidently affected to a certain extent by the prospect of reduced freight rates.

The quietest market during the week was Chicago. As in other centers, single machine inquiries and an inclination to consider used equipment was notable. Western railroads are still delaying action on their lists. The Sante Fe continues to add items to its pending inquiry and is now asking for a power-driven band saw and a wood-working machine. The Erie Railroad and the Illinois Central have placed orders.

New York

New York, Feb. 7.

Few orders were reported this week in the crane market. Several new inquiries have appeared, however, and several inquiries that have been in the market for some time are extremely active and may be closed within the next week. The inquiry of the Lamson Co., Boston, Mass., is again active. Among recent inquiries is one from Stone & Webster, Boston, for a 10-ton and 15-ton overhead traveling crane with alternate specifications, for the Ford plant at Green Island. The Phoenix Utilities Co., New York, which inquired for prices on a 40-ton, 50-ton and 60-ton crane, hand power and one motor with electric hoists, has decided to purchase the 60-ton crane. Bidding to J. E. Woodwell, consulting engineer, 501 Fifth Avenue, New York, on the 75-ton, 66-ft. 4-in. span, 4-motor, overhead traveling crane for a power house in Lansing, Mich., resulted in a low bid of \$15,050 by the Whiting Corporation, \$15,280 by the Milwaukee Electric Crane & Mfg. Co., and \$15,545 by Manning, Maxwell & Moore, Inc.

Among recent sales were three small cranes sold by the Whiting Corporation to S. Firestone, consulting engineer, Rochester, N. Y., for a new plant of the Aetna-Portland Cement Co., at Essexville, Mich. The Industrial Works sold a 30-ton, 50-ft. boom locomotive crane with grab bucket to the Aetna-Portland Cement Co.

The Max Schaffer Co., 26 Warren Street, New York, manufacturer of gas lighting and burning equipment and supplies, will soon take bids for a top addition to its eight-story plant, 75 x 100 ft., at 31-33 West Fifteenth Street, including improvements in the present factory, estimated to cost \$30,000. Maurice Courland, 47 West Thirty-fourth Street is architect.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Feb. 21, for one surface

condenser, for the navy yard at Iona Island, N. Y.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has made application for permission to issue bonds or stock to an amount of \$10,000,000, a portion of the proceeds to be used for a new power plant on Sixty-sixth Street, estimated to cost in excess of \$500,000. It will be 80 x 130 ft.

The Cutting-Larson Co., 109 West Sixty-fourth Street, New York, representing the Oldsmobile Co., has awarded contract to the Barney-Ahlers Co., 110 West Fortieth Street, for a six-story automobile service and repair works, 100 x 120 ft., on Sixty-sixth Street, estimated to cost \$200,000.

The Erie Railroad Co., 50 Church Street, New York, has leased its car repair shops at Buffalo, N. Y., to the Seminole Construction Co., Buffalo, headed by William H. Fitzpatrick, which will operate the plant for contract work for the road. Operations were commenced on Feb. 6, maintaining the present working force. The railroad company is arranging, also, for a lease of its shops at Salamanca, N. Y., to a private operating company. The company has signed a lease with the Youngstown Equipment Co., Youngstown, Ohio, for the operation of its car shops at Brier Hill, Ohio, and locomotive shops at Kent, Ohio.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., has arranged an appropriation of \$1,000,000, for the installation of new equipment at its plant, comprising a 20,000-hp. generator and auxiliary machinery. Charles S. Ruffner is first vice-president and general manager.

Fred L. Brown, Locust Street, Hudson Falls, N. Y., will commence the immediate erection of a two-story automobile service and machine repair building, 70 x 100 ft. The H. P. Cummings Construction Co., Colvin Building, Glen Falls, N. Y., is the contractor.

A one-story automobile service and repair works for company cars will be constructed by the Willow Brook Dairy Co., 5 South Fulton Street, Mount Vernon, N. Y., in connection with the erection of its new bottling plant.

to the Barney-Ahlert Co., New York, estimated to cost \$200,000.

The Savage Arms Corporation, 50 Church Street, New York, with plants at Utica, N. Y., and Philadelphia, is arranging its works for a new line of production to include refrigerating machinery and parts, and electrically operated washing machines.

The Radio Mfg. Co., 170 Fifth Avenue, New York, has leased property at 251 Fourth Avenue, for local works.

Fire, Feb. 2, destroyed a machine shop and other buildings at the locomotive shops of the Lehigh Valley Railroad Co., Jersey City, N. J., with loss reported in excess of \$50,000, including equipment.

The Tide Water Oil Co., 11 Broadway, New York, is completing plans for a new one-story works building, 35 x 60 ft., on Lyons Avenue Irvington N. J. to cost about \$25,000. Bids will be asked early in April.

A vocational department will be installed in the three-story high school to be constructed at Asbury Park, N. J., estimated to cost about \$400,000. E. F. Arend, 105 West Fortieth Street, New York, is architect and engineer.

Power equipment and other mechanical apparatus will be installed in the new two-story factory of the American Hook Co., 100 Washington Square, East, New York, at Watsessing and Bloomfield avenues Bloomfield, N. J., ground for which has been broken by the Austin Co., 217 Broadway, New York, contractor, estimated to cost about \$200,000.

The Ford Motor Co., Lincoln Highway, Kearny, N. J., will commence the immediate rebuilding of the portion of its local assembling plant, destroyed by fire, Feb. 1, with loss reported at \$250,000, including equipment. The jacking and other departments were partially destroyed.

A vocational department will be installed in the new four-story high school to be erected at Hightstown, N. J., estimated to cost about \$150,000. Gullbert & Petelk, 686 Broad Street, Newark, N. J., architects, are preparing preliminary plans.

An ordinance covering the vacating of property in the vicinity of the plant of the Standard Underground Cable Co., Perth Amboy, N. J., passed recently by the Board of Aldermen to permit the erection of additions has been annulled by the State Supreme Court on the grounds of unreasonable exercise of municipal power, and the proposed extensions estimated to cost about \$200,000 will be held in temporary abeyance.

An electric power plant machine and other vocational shops will be installed in the four-story junior high school 117 x 34½ ft., to be erected at First Avenue and Loomis Street, Elizabeth, N. J., contract for which has just been awarded to H. Wilhelm Sons Inc., 803 East Jersey Street, Elizabeth, contractor, estimated to cost \$580,000. C. Godfrey Poggi, 275 Morris Avenue, Elizabeth, is architect.

Officials of the Public Service Corporation, Public Service Terminal, Newark, have organized a subsidiary company, the Public Service Production Co., capitalized at \$1,000,000, to engage in engineering and construction enterprises. A feature of the work will be electric power plant construction and steam railroad electrification. Negotiations are said to be under way with the Lackawanna Railroad for extensive work of the latter character. Thomas N. McCarter, president of the parent company and other operating subsidiaries, will head the new organization. Nathaniel A. Carle, chief engineer for the Public Service Electric Co., will be vice president and general manager.

The Solar Light Co., 69 Wooster Street, New York, manufacturer of nitrogen high power lamps, etc., has leased a portion of the building at 24 Michanic Street, Newark, for a branch plant. Possession will be taken at once and necessary equipment installed. Joseph Blum is secretary.

A machine shop for automobile service and repair work will be installed in the new building to be erected at J. 11 New Jersey Railroad Avenue, Newark, for the Black & White Taxi Co., now located at 9 New Jersey Railroad Avenue. It will be one-story, 50 x 125 ft.

The Morse-Rogers Steel Co., Cleveland, advises that for the past three years it has had an Eastern warehouse and office in Newark, but owing to the fact that it required larger quarters, space has been leased in the new Ship Terminal plant at Lincoln Highway and the Passaic River.

Export Trade Opportunities

The Societe Anonyme des Automobiles Excelsior, Savenhem, Belgium, would like to hear from manufacturers of gang drills and boring machines suitable for making 6-cylinder automobile engines.

Ernst Gleitsmann & Co., Postoffice Box No. 78, Libau, Latvia, advise The Iron Age that they desire to represent American manufacturers of machine tools and small tools in Latvia and Russia. They write that they are in touch

with all of the largest buyers in Latvia and Russia and in a position to close some business. Catalogs and prices are requested.

Buffalo

Buffalo, Feb. 6

The Joseph Schonthal Co., Buttes and Michigan avenues, Columbus, Ohio, scrap metals, has acquired the plant and business of the American Foreign Steel Co., Ingham Avenue, Buffalo, devoted to a similar line of operation, and will take immediate possession. The purchase includes all equipment including cranes, scrap breaking machinery, etc., as well as about 5½ acres for future expansion. The consideration is said to be \$80,000. Joseph Neeb, heretofore local manager at the plant, will continue in the same capacity for the new owner.

Fire, Jan. 29, destroyed a portion of the car shops of the New York Central Railroad Co., Grand Central Terminal, New York, at Lyons, N. Y., with loss estimated at close to \$30,000.

A vocational department will be installed in the new high school to be constructed at Owego, N. Y., George S. Decker, president, estimated to cost about \$250,000. Preliminary plans are being prepared by Coffin & Coffin, 522 Fifth Avenue, New York, architects.

Negotiations are under way for the purchase of the plant and property of the Lamoka Electric Water & Power Corporation, Conning, N. Y., by W. P. Gannon, 103 South Avenue, Syracuse, N. Y., and associates. The purchasing interests will maintain the present company and operations, and plan for the construction of a hydroelectric generating plant on Lake Lamoka with initial capacity of approximately 1,000 hp to be used in conjunction with the present system.

The Oswego Mills Corporation, Fulton, N. Y., has been organized with a capital of \$2,500,000 to take over and consolidate the plants and businesses of the Oswego Falls Pulp & Paper Corporation, Fulton, and the Skaneateles Paper Co. and the Seal Right Co. Inc., both of Skaneateles. The merged company will operate three mills at the two places noted and has preliminary plans under consideration for general expansion. For this latter purpose and general financing a bond issue of \$2,100,000 has been sold. H. L. LaBock is president.

Chicago

Chicago, Feb. 6.

The past week has been a quiet one in the local machine tool market, although a few sales of large machines have been closed. Large industrial companies which are normally large purchasers of machine tools are not active in the market and Western railroads are still delaying action on their list. Inquiries for single machines from widely distributed sources are still the rule and in many cases these prospects are uncovered only after a thorough canvass by the sales forces of local machinery houses. There continues to be a certain amount of shopping in the local district, but in most cases prospective buyers are looking for bargains, showing a preference for used equipment or demonstration machines.

Among recent orders placed may be mentioned a used 60 in. boring mill and a 36 in. x 36 in. x 8-ft. open side planer bought by the A. Y. McDonald Mfr. Co., Dubuque, Iowa. The Erie Railroad has placed an order for two No. 2 Niles axle lathes with the David A. Wright Machinery Co., Chicago. A 2 in. shaper has been purchased by the Illinois Central. The Santa Fe continues to add a few items to its pending list from time to time, the latest additions being one Atkins No. 7 power driven band saw or equivalent, and one Day & Fran No. 62 or equivalent universal wood-working machine arranged for belt drive. Among other small inquiries recently received are the following: Wichita Northwestern Railway Co., Hutchinson, Kan., one used 36-in. x 6-ft. engine lathe, one used air compressor with 8 in. bore, 100 lb. pressure and generating not less than 100 lb. pressure per sq. in. and one used 1½-in. bolt cutter. New Ulm M. Co., New Ulm, Minn., a used centerless grinder and a small milling machine, Marinette Iron Works, Marinette, Wis., a used Acme 1½-in. single bolt cutter, Steel Sign Service Co., Detroit, Mich., a used iron bottom folder with a capacity for 24-gage sheets.

The Dwyer Equipment Co., 9 West Kinzie Street, Chicago, manufacturer of "Twinfan" ventilating heating units, has let contract for a one-story plant, 60 x 125-ft., at 4584 North Avenue, to cost \$15,000.

Michaelson & Rognstad, architects, 3815 West Congress Street, Chicago, are preparing plans for a one-story foundry and machine shop, 80 x 144 ft., for the west side, to cost \$60,000. The architects will receive bids in about two weeks.

THE IRON AGE

When the identity of the company for which the plant is to be built will be disclosed. The same architects have received bids on a three-story automobile building and repair station, 25 x 110 ft., 2452 South Michigan Avenue, for Landrey & Maypole, 2440 South Michigan Avenue. It will cost \$40,000.

Orlando Van Dunten, architect, 800 North Clark Street, Chicago, is receiving bids on a two-story automobile and machine repair shop, 42 x 82 ft., at Howard Avenue and North Clark Street, for H. Johnstone, to cost \$20,000.

L. G. Hallberg & Co., architects, 116 South Michigan Avenue, Chicago, are receiving bids on a two-story factory, 100 x 100 ft., on Western Avenue, for the David J. Malloy Co., book binders, 633 Plymouth Court, at a cost of \$100,000.

The Western Electric Co., Hawthorne, Ill., is having plans drawn for a four-story factory for the manufacture of packing material.

The General Die Casting Co., recently incorporated with \$25,000 capital stock by M. C. Duhr, J. G. Turner and D. C. Robson, will manufacture die castings in standard and special alloys. It has leased a plant at 2533-2539 North Ashland Avenue, Chicago, and its initial equipment will comprise 12 die casting machines and necessary appliances.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, proposes to erect a power plant with a capacity of 200,000 kw. on a site of 87 acres which it has acquired near Waukegan, Ill.

The Chicago Grain Products Co., manufacturer of grain alcohol, has started the erection of a power plant in connection with its distillery at Rockford, Ill., to cost \$102,000.

The Central Illinois Public Service Co. is preparing plans for a new power plant at Grand Tower, in Jackson County, Ill., with an initial capacity of 30,000 kw. It also proposes to increase the capacity of its Harrisburg, Ill., plant to 30,000 kw.

The Casey-Hudson Co., manufacturer of screw machine products, 361 East Ohio Street, Chicago, will move to Chelsea, Mich., where it will occupy a foundry and power plant purchased from the Lewis Spring & Axle Co.

The Power plant of the Wood Lake Electric Co., Wood Lake, Neb., was recently destroyed by fire with a loss estimated at \$5,000.

The Peoria Auto Parts Co., Peoria, Ill., is having plans prepared for a new two-story works, 60 x 100 ft., to cost about \$100,000, including equipment. R. L. Hulcebus, Jefferson Building, is architect.

The Woodmanse Mfg. Co., 16 Galena Street, Freeport, Ill., manufacturer of pumps, wheelchairs, etc., is planning for the erection of a new two-story addition estimated to cost about \$35,000.

The Office of the Purchasing Agent, Post Office Department, Washington, will receive bids until Feb. 20 for six electric tractors, 400 trailers, and 1200 combination balance trucks and trailers for use at the Chicago post office.

The Board of Education, Lincoln, Neb., has commissioned Fliske & Meginnis, architects, 533 Bankers' Life Building, to prepare plans for a one-story vocational shop for use in connection with the city high school, estimated to cost about \$125,000, including equipment. J. G. Latham is secretary of the board.

The Farmers' Terminal Packing Co., 920 Commerce Building, St. Paul, Minn., has plans under way for a one-story ice-manufacturing plant, 100 x 100 ft., estimated to cost about \$50,000. Bids will be asked early in the spring. The Newsstrom Lundquist Co., 810 Lumber Exchange Building, Minneapolis, Minn., is architect.

A vocational department will be installed in the two-story high school to be erected at Clarkfield, Minn., estimated to cost about \$100,000. Bids will be called early in March. Prins Buckley & Ross, Palace Building, Minneapolis, Minn., are architects.

A vocational department will be installed in the three-story and basement high school to be erected by the Board of Education, State Center, Iowa, estimated to cost about \$185,000. Plans are being prepared by H. E. Reimer, architect, Kibby Building, Marshalltown, Iowa.

Detroit

DETROIT, Feb. 6.

At a recent meeting of the Northern Wheel Co., Alma, Mich., plans were outlined for taking over the plant of Rollstrom Motors, Inc., St. Louis, Mich. The plan proposes increasing the common stock of the wheel company by \$250,000 to purchase the Rollstrom plant and add new equipment to manufacture automobile wheels.

The Anchor Concrete Machinery Co., Rock Rapids, Iowa, has moved to Adrian, Mich., and incorporated for \$100,000.

The plant and site of the Adrian Steel Castings Co. have been purchased and machines for producing blocks, bricks, and cement will be made.

The Alamo Heating Co. and the Gray Iron Foundry Co., both of Muskegon, Mich., which have been working on a partnership agreement for the past year in the manufacture of furnaces and other foundry and machine products, have formed a new corporation, capitalized at \$100,000, to operate under the name of the Gray Iron Foundry & Furnace Co.

The Cyclone Motors Co., maker of motorcycles, which recently announced that it would locate in Benton Harbor, and which is headed by John M. Eaton, long associated with the Lincoln Motors, has entered into a contract to buy the plant of the Peninsular Lumber Co., Benton Harbor.

The Brunswick, Balke, Collender Co., Chicago, will locate its entire facilities for the manufacture of phonograph record disks at the present phonograph plant in Muskegon, Mich. About 300 more men will be added to the working force at Muskegon.

The Lincoln Mfg. Co., Detroit, will build an addition in the spring. It will be three stories, 30 x 115 ft., and will cost \$100,000. The company manufactures electric lighting fixtures.

The Victor Screw Works, Inc., and the Peninsular Milled Screw Co., both of Detroit, have been merged under the name of the Victor-Peninsular Co. The consolidated organization will occupy a new plant at Lawton and Hancock streets and will manufacture a complete line of machine screws and other threaded machine products.

Fire, Jan. 24, destroyed a portion of the plant of the Barnes Wire Fence Co., Detroit, with loss estimated at about \$65,000, including equipment. The works of the Selik Brothers Machine Co., also, were partially destroyed, with loss approximating \$23,000.

The Grand Rapids Metal Products Co., 1530 Monroe Avenue, N. W., Grand Rapids, Mich., is planning for the installation of a new drill press and other machine tool equipment.

The Cadillac Tool Co., Detroit, has decided to dissolve, and accordingly this dissolution is going on. A new concern to take its place in the territory of the old company has just been incorporated under the name of the Cadillac Machinery Co. and will have the old personnel of the Cadillac Tool Co., which were engaged in the sale of machine tools. The new concern will not do any manufacturing, as did the old, but will devote its entire efforts to the sale of machine tools. The personnel of the Cadillac Machinery Co. will consist of C. L. Campbell, C. E. French, L. E. Burbee, C. G. Valentine, and R. J. Borneman, and the same territory will be covered as previously covered by the Cadillac Tool Co. The wish of Mr. Fowl, the former president, as expressed in his will, was that the men associated with him in the Cadillac Tool Co. should continue to be interested in carrying on the business which he started. The result is that at the dissolution of the Cadillac Tool Co. the Cadillac Machinery Co. has been formed. Its sales room is located at the corner of East Lafayette and Beaubien streets.

Philadelphia

PHILADELPHIA, Feb. 6.

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids under schedule 9416 for one shearing machine, one cutting machine and power press, until Feb. 21, for use at the Philadelphia Navy Yard.

The Reading Hardware Co., 816 Arch Street, Philadelphia, manufacturer of hardware and metal specialties, with plant at Reading, Pa., has acquired the property of the Haverford Cycle Co., 9 North Street, 25 x 114 ft., for its local branch.

Fire, Jan. 29, completely destroyed the box plant of Clements Brothers, Delaware Avenue and Water Street, Philadelphia, with loss estimated at close to \$70,000, including woodwork and other machinery.

The Wayne Oil Tank & Pump Co., 112 North Broad Street, Philadelphia, with plant on Canal Street, Ft. Wayne, Ind., has leased the new building to be erected at Broad Street and the Richmond branch of the Philadelphia & Reading Railroad for a local factory branch.

The Bureau of Water, City Hall, Philadelphia, is having plans prepared for a one-story machine shop and automobile service works, 100 x 160 ft., at Twenty-eighth and Cambria streets, estimated to cost about \$60,000.

A vocational department will be installed in the new junior high school buildings to be erected by the Board of Education, Philadelphia, consisting of three schools, at Twenty-fourth and Jackson streets; Fifty-fourth and Warrington streets, and at Thirteenth and Loudon streets, respectively. A fund of \$2,000,000 is being arranged.

E. H. Weiss, 1228 Olive Street, Philadelphia, manufacturer of wire products, has awarded contract to **Frank I. Wintz**, 1618 North Twenty-seventh Street, for a two-story and basement addition, 80 x 96 ft., adjoining the present works estimated to cost about \$25,000. Wire braiding and other machinery will be installed.

The **John E. Thropp's Sons Co.**, Lewis Street, Trenton, N. J., manufacturer of rubber-working machinery has organized the **Hendrie Rubber Tire Co.** capitalized at \$200,000 under State laws to take over and operate the plant of the **Hendrie Rubber Co.** Torrance Cal. The plant will be arranged to develop a capacity of 350 tires and 200 tubes per day. The new company is headed by **Thomas H. Thropp**, president and general manager, **Peter D. Thropp** vice-president, **John E. Thropp**, secretary and **William Baker** treasurer. The last noted will take up a residence at Los Angeles and be in charge of operations.

Fire, Jan. 27, destroyed a portion of the ice manufacturing plant of the **American Ice Co.** Philadelphia, at Atlantic City, N. J., with loss estimated at about \$60,000. The company has just broken ground for the erection of a one-story and basement addition 44 x 149 ft. at Arctic and Michigan avenues.

A vocational department will be installed in the three-story and basement 130 x 165 ft. senior and junior high school to be erected at Wayne by the **Ridner Township School District**. **Joseph C. Egbert** secretary, 115 North Wayne Avenue, Wayne, Pa., estimated to cost about \$1,000,000. **W. C. Richards**, 608 Chestnut Street, Philadelphia, is architect.

The **Freed Heater Co.**, Collegeville, Pa., manufacturer of heating equipment, iron castings, etc., is planning for enlargements with new equipment. The company is now giving employment to about 60 core makers, molders and machinists. A capital stock of \$1,000,000 is being arranged to provide funds for the expansion.

The **United Ice & Coal Co.**, Lorister and Cowden street, Harrisburg, Pa., will soon call for bids for its new one-story ice manufacturing and shipping plant 60 x 110 ft. at Seventh and Schuylkill streets. Estimated to cost about \$170,000. It will have an initial daily capacity of about 100 tons. **Mihlow Miller** is the architect.

The **East Penn Foundry Co.**, Macungie, Pa., has enlargements in its plant under way. New equipment for brass casting and other manufacture will be installed.

The **Nileco Lamp Works Inc.**, Emporium, Pa., has been chartered under State laws with capital of \$100,000 to manufacture electric lamps, operating at the former plants of the **General Electric Co.** at Emporium and at **Marys, Pa.**, recently acquired. **B. C. Lebkue** is president and **Clay S. Felt** treasurer.

The **Butler Automotive Steel Co.**, Easton, Pa., recently organized has taken over the local plant and business of the **Butler-Edwards Electric Co.** Operations will be devoted to the manufacture of automobile parts and affiliated steel specialties and the line of electrical equipment heretofore produced will be discontinued.

James & Son, Plymouth, Pa., manufacture of mine drills and kindred equipment have consolidated with the **Hittenbader**, **Legg** and **Mitchell** Works, Barney Street, Wilkes-Barre, Pa., manufacturer of similar equipment. The present Plymouth works will be removed to Edwinstown, Pa.

Claude V. Brong, 514 Third Street, Allentown, Pa., operating a mechanical and vulcanizing department, is planning for the installation of a new department to manufacture storage battery equipment and for general electric battery repair work.

Cleveland

(CLEVELAND) Feb. 6

Machine tool orders show some gain and there is a marked increase in the number of inquiries, some of which are for round lots of tools. While a few of the larger inquiries are regarded as tentative, they indicate that machinery users are at least considering the buying of equipment. Several inquiries have come out for automatic screw machines. One is a tentative inquiry from a manufacturer of electrical equipment for 60 to 75 machine. Another is from an automobile manufacturer for 15 machines and a third from a locomotive plant for four to six machines. A Michigan automobile manufacturer is contemplating the purchase of from 15 to 20 planers to replace present equipment. A Detroit plant is figuring on the purchase of machine tool equipment for making 25,000 motor valve stems per day. A Battle Creek, Mich., manufacturer is reported to be in the market for three turret lathes.

Locally an improvement in single tool orders is noted much of this business coming from makers of various specialties and some from manufacturers of automobile accessories. One dealer took an order for a lathe for shipment by express from the factory. Cases are reported where manu-

facturers have withdrawn from the market some machinery that they had offered for sale, advising the trade that with improvement in the outlook they may have use for the machines. For the first time in months a little machine tool business is coming from the Akron rubber industry. The **Herbrand Co.**, Fremont, placed orders for a 1200-lb. and a 1500-lb. board drop hammer to replace present equipment. A Cleveland foundry and machine shop is inquiring for a 10 ft. vertical boring machine with extensions providing a 16 ft. swing.

The **National Acme Co.**, Cleveland, has announced price reductions on its line of automatic screw machinery effective Feb. 1. The cuts vary on different types of machines, but average approximately 25 per cent.

The **Wright Mfg. Co.**, Lisbon, Ohio, has taken up the manufacture of automobile pistons in connection with its regular line of chain hoists, trolleys and cranes.

The **Palmer Mach. Co.**, Kenmore, Ohio, recently incorporated with a capital stock of \$1,000,000 will receive bids shortly for its proposed new plant.

The **W. W. Six Mfg. Co.**, Cleveland, has taken a contract for sand blast equipment for the Detroit plant of the **American Car & Foundry Co.** This equipment is designed for cleaning four freight cars at a time.

The **Vervoort Roll Bearing Co.**, 10 East Eighteenth Street, Cleveland, has taken over the **Superior Roller Bearing Co.** formerly located in Canton, Ohio. Officers have been elected as follows: President, **J. T. Koepke**, vice president, **J. V. Zupnik**, secretary and general manager, **Henry G. Triemmel**, treasurer, **F. W. Watson**. The company is building a new plant which will be completed in the spring.

The **Kerscher Brothers Machinery Co.**, 911 Ontario Street, Toledo, Ohio, manufacture of hydraulic and electrically operated freight and passenger elevators has completed plans for a one-story addition 4 x 150 ft. **George J. Kerscher** is president.

A vocational department will be installed in the new two-story high school to be erected by the Board of Education, Westerville, Ohio, estimated to cost about \$150,000. **Glass & Austin**, Garco Building, Columbus, Ohio, are architects.

New England

(BOSTON) Feb. 6

There is considerable machine tool prospective business in this territory but it is maturing slowly. A week ago it was generally anticipated in local circles that a good amount of business would be booked by now, but results have been disappointing. Additional prospects have come to light since then, largely from small and unimportant interests, involving one, two or three pieces of equipment, and generally used in home industry. The local trade, at least, has not lost its enthusiasm and cheerfulness, however, and believes that business cannot be delayed much longer.

Among sales the past week were one 16 in. x 6-ft. lathe, and one 9 in. x 3 ft. tool bought by two separate local concerns, two 9 in. x 4 ft. lathes to a greater Boston automobile service station, one 24 in. x 10 ft. lathe to Worcester interest, special grinding production equipment to **Gray & Davis**, Cambridge, Mass., lighting and starting systems, a vertical boring machine costing \$12,000 to another Cambridge manufacturer, and a 16 in. x 10 ft. toolroom lathe to the **Hood Rubber Co.**, Woburntown, Mass. Possibly 20 other lathes including some 36 in. tools are under negotiation. Competition for lathe business is keen, and prices naturally are in the buyer's favor.

The **H. B. Smith Co.**, Westfield, Mass., inquiry includes one 18 in. one 10 in. and 14 plan turning lathes, one 72-in. and one 30 in. planer, one No. 6 Becker vertical milling machine, one 4 ft. radial drill, one 3 in. upright drill, one 1 in. shaper, floor boring equipment, a wet tool grinder, and a keysever. The **Lambson Co.**, Boston, is inquiring for three pipe working machines, a gate shear, double angle bar double end punch and shear and miscellaneous smaller equipment for its new Rochester, N. Y., plant. In both instances these concerns are planning to take at least some used equipment. The **New England Oil Refining Co.** has a small list of shop equipment needed for a Rhode Island plant. The **Boston & Albany Railroad** is inquiring for brass work lathe equipment and a Worcester concern for shaper and lathe requirements.

One of the most encouraging features in the New England machine tool industry is the greater activity in small tools which generally is indicative of increased bookings on heavier equipment. At least one company reports January sales of small tools is larger than in any previous six months. Other representatives of machine tool builders note a larger movement of small equipment out of stock.

In line with this information is a decidedly better inquiry for abrasive wheels, the demand, however, running more to

the smaller than the larger sizes. In contrast, it may be said that probably no branch of the machine tool industry is less active than the grinding machine. The increased call for small abrasive wheels would therefore indicate more activity in small machine shops. The market on drills and reamers is unsettled, due to the wide variety in prices for and origin of stock offered.

Excavating has begun for a one-story 60 x 65 ft machine shop to be erected in Nathan Place Lynn by George L Covert Spring Street.

The Fales & Jenks Machine Co Pawtucket R I has purchased land adjoining its plant on Dexter and Barton streets on which an addition is contemplated at some future date.

The Fall River Gun Works Co Fall River Mass will erect a one-story 26 x 42 ft boiler house. John F Dillon 24 Manton street will supervise the construction.

The George Grow Tire Co Canton Mass contemplates the erection of in addition to cost approximately \$25,000.

The plant occupied by Stone & Murphy Middletown Conn automobile accessories last week was badly damaged by fire. It will be rebuilt.

The R H Long Co Framingham Mass automobiles has leased for a long term of years 30,000 sq ft of floor space at 84 Commonwealth Avenue Boston as a show room and service station.

Fire Feb 1 in the finishing and etching department of the Lamson & Goodnow Co Shelburne Falls, Mass maker of cutlery burned out the upper portion of the building. Loss on building is estimated at \$10,000 which figure will be heavily increased by loss on machinery and stock as yet undetermined. The company reports that delivery of orders will be resumed within a week. Arthur J Rowland superintendent, while inspecting the ruins suffered a fall which resulted in breaking both his legs and one foot arch.

The W F Concanannon Shear Co 42 Depot Street Milford Conn has recently been incorporated to manufacture steel shears and scissors. The capital stock is \$20,000, and the officers are President W F Concanannon, Bridgeport and Edwin L Oviatt, Milford treasurer. It has taken over the old mill building of the Milford Grain Co and production has been started.

The New Haven Appliance Co New Haven Conn was recently incorporated to carry on a general manufacturing business. The capital stock is \$50,000 and the incorporators are H H Holmes 126 Mansfield Street H W McQuinn New Haven and R H Chirwin Hamden Conn.

A vocational department will be installed in the new junior high school to be erected by the city of Worcester. The Joseph D Leland Co Boston and Worcester are architects engineers.

The Narragansett Electric Lighting Co 170 Westminster Street Providence R I has preliminary plans for a new power plant and mechanical works at Longfellow and Melrose streets. The power plant will be two-stories 40 x 56 ft and two mechanical buildings three stories 100 x 222 ft and one story 120 x 222 ft respectively. The latter structure will be equipped with two electric traveling cranes. A machine shop and garage for company cars 114 x 17 ft will also be erected. The entire plant will approximate four acres of floor space. Bids will be asked early in March. Tenks & Fallon 103 Governor Building Providence are engineers.

The Bureau of Yards and Docks Navy Department Washington is tiling bids until Feb 15 under specification 4570 for a motor generator set and switchboard for use at the Commandant's submarine base of the department.

The Cumberland County Power & Light Co Portland Me has awarded a contract to the Foundation Co 120 Liberty Street New York for a new power plant estimated to cost close to \$1,000,000. Two turbine generating units will be installed with auxiliary machinery.

A portion of the power house and other departments at the plant of the Atwood Ply Co Rock Village Mass were destroyed by fire Feb 1 with loss estimated at \$30,000.

Indiana

INDIANAPOLIS Feb 7

The Indiana Electric Corporation Indianapolis is planning for the construction of an electric generating plant on the Wabash River in the vicinity of the Vigo County coal fields estimated to cost close to \$6,000,000 with equipment. Application has been made for permission to issue stocks and bonds to secure funds for the project. The company has also applied for permission to acquire seven electric power companies in this district including the Merchants Light & Heat Co Indianapolis for a consolidation.

Richard Miller, care of the City Trust Co., Market and

Delaware streets, Indianapolis, is organizing a company to operate a commercial automobile service and repair plant. Plans are being prepared for a five-story and basement works on Illinois Street, estimated to cost about \$750,000. It will have a capacity of 700 cars. Bass, Knowlton & Co., 501 Hume Mansur Building, are architects.

A vocational department will be installed in the two-story and basement high school, 200 x 248 ft, to be erected at Goshen Ind estimated to cost about \$300,000. A. H. Elwood & Son room 201 Haynes Building Elkhart, Ind., are architects.

The Visible Pump Co Ft Wayne Ind, with plant at New Haven Ind is planning for the immediate removal of its plant to a factory at Findlay Ohio where production will be increased.

The Bloomington Nash Motor Co Bloomington, Ind, has awarded a contract to the State Construction Co 727 Indiana Pythian Building Indianapolis for the erection of a two-story and basement service and repair works 85 x 130 ft, to cost \$80,000. Walter L Hottle is head.

The Indiana & Michigan Electric Co South Bend, Ind, has been granted permission by the Public Service Commission to issue preferred stock to an amount of \$300,000, the proceeds to be used in part for extensions and improvements.

The South Bend Brewing Co South Bend, Ind is building a one-story ice manufacturing plant 90 x 90 ft to cost about \$60,000 including equipment.

The Bloomington Brick & Tile Co Bloomington Ind, has preliminary surveys under way for its new plant estimated to cost about \$200,000 including machinery. A W Beecher is president.

Baltimore

Baltimore Feb 6.

Fire Jan 30 destroyed one of the machine repair shops at the plant of the Bethlehem Steel Corporation Sparrows Point Baltimore with loss estimated at about \$50,000 including equipment.

The Board of Awards, City Hall Baltimore P W Wilkinson secretary is taking bids until Feb 15 for six triple-combination gasoline driven pumping engines and one 3½ x 4 ton tractor.

The Cumberland Sales & Service Station Cumberland Md is having plans prepared for a new automobile service and repair building 100 x 150 ft estimated to cost about \$100,000 including equipment. T W Riddle Jr Cumberland is architect.

The \$100,000 expenditure to be made by the Eastern Shore Gas & Electric Co, Salisbury Md during the present year for plant additions and improvements will include the construction of a new generating plant at Laurel Del to cost about \$160,000 installation of new equipment in the switching and transformer plant at Salisbury new transmission line to cost over \$100,000 between Salisbury Laurel and Denton and to Cambridge Md and miscellaneous distributing system equipment to cost about \$30,000.

The Western Maryland Railroad Co Baltimore has leased its car and locomotive repair shops at Elkins, W Va to W K Hosley contractor, who will operate the plant as a private enterprise. It has been giving employment to about 100 men and this force will be retained.

The Bureau of Supplies and Accounts Navy Department, Washington is taking bids until Feb 14, under schedule 9429 for two gasoline engines for the navy yard at Annapolis Md.

The plant of the Hagerstown Bearing Metal Co Hagerstown Md has been acquired by the Maryland Smelting & Refining Co 28 West Annetam Street Hagerstown, recently organized. John D Keith and Henry H Keedy, Jr, head the company.

The Board of Awards City Hall Baltimore, will take bids until Feb 15 for furnishing and delivering steel screens for the Loch Raven Dam waterworks as per specifications on file at the office of William A Megraw water engineer, City Hall.

The Northern Maryland Electric Co, Elkton Md, has closed negotiations for the purchase of the Havre de Grace Electric Co operating at Havre de Grace Aberdeen and Perryville Md and vicinity. Extensions and improvements are planned. The Northern Maryland Company is said to be planning also for the purchase of the Glipin Falls Electric Co, operating in the same section. J H Ware is president.

The Superior Anthracite Coal Corporation, Pulaski, Va is planning for the installation of electrically operated mining machinery at its property, and other equipment. The company has increased its capital to \$100,000. Clyde B Smith is president.

Fire, Jan. 23, destroyed the planing mill and machinery at the plant of the Thomasville Variety Works, Thomasville, Ga., with loss estimated at about \$75,000. K. E. Mack is head.

The Buick Ice Co., Cleveland, Ga., has plans under way for the erection of a new ice-manufacturing plant with initial capacity of about 30 tons a day.

The Wilson Motor Co., High Point, N. C., has acquired adjoining property and plans the erection of a three-story repair and service building, estimated to cost about \$75,000.

The Jefferson Mfg. Co., Columbia, S. C., is planning for the establishment of a new plant to manufacture road machinery and parts, corrugated culverts, etc. Harry J. Kuhr, Columbia, is president.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids under schedule 4570, until Feb. 15, for a motor generator set and switchboard for the Hampton Roads, Va., navy yard.

The Consumers' Coal Co., Masonic Temple, Winston-Salem, N. C., will build a new ice-manufacturing plant, with daily capacity of 30 tons, which later will be more than doubled. It will cost close to \$40,000.

M. L. Himmel & Son., 107 North Frederick Street, Baltimore, manufacturers of office fixtures, etc., are preparing to move into a larger plant at Calverton Road and Hollins Street.

Cincinnati

CINCINNATI, Feb. 6.

January was the best month in a year, from the machine tool manufacturers' standpoint, a number of fair sized orders being booked by local builders. The first week in February also showed fair activity and indications point to a steadily increasing business. During the week a local manufacturer booked an order for 10 shapers from an Eastern concern. A Michigan motor manufacturer is also understood to have placed an order for 12 grinding machines of special type in this market. A manufacturer of boring mills booked an order for three machines, and another manufacturer reports orders the past week for five drilling machines and three engine lathes. The International Nickel Co. purchased tools for its Huntington, W. Va., plant. A local planer manufacturer booked orders for two machines, one for Western shipment and another for a manufacturing plant in New York State. There are several inquiries before the trade, one of which is from the Ford Motor Co. for a large planer and another from a northern Ohio manufacturer for three gear cutting machines. The number of inquiries for single tools is also increasing steadily and a fair percentage is developing into orders. Local manufacturers see in the settlement of the Shantung problem, indications of better business with the Far East. One maker was informed by the president of a New York exporting house, which recently inquired for 15 tools for Japanese shipment, that this order and many others would probably be placed soon after the political problems in the Far East has been ironed out. Used machinery dealers report a slight falling off in the volume of business offering but there is still a fair market for what might be called bargains in used equipment.

The Hocking Valley Railroad Co. has issued a list of seven tools, including one 25 x 10 heavy geared head, a.c. motor driven engine lathe; one extra heavy double end car axle lathe with crane attachment 8 ft. between centers; one 18 x 8 heavy duty geared head a.c. motor driven engine lathe; one 24 x 8, heavy duty a.c. motor driven engine lathe; one 36 x 6, slab milling machine, motor driven; one 36 in. stroke motor driven, crank planer; one punch and shear capacity of 1-in. diameter holes 1/2-in. iron or mild steel.

The Universal Metal Box Co., Cincinnati, has been incorporated with a capitalization of \$75,000. Its plans as to location and products have not been definitely completed. D. A. Walker, president Cadillac Can Co., 835 West Sixth Street, heads the company.

Fire Dec. 22 practically destroyed the plant of the Breese Brothers Co., sheet metal manufacturer, at 2347 Reading Road, Cincinnati. The damage is estimated at \$50,000. Temporary quarters have been secured and business will be continued. Plans for the future have not been completed but it is expected that a larger building will be erected on the site of the old plant.

Reports are current that manufacturers of closely allied tools are considering the advisability of consolidating their interests to reduce manufacturing costs. This is more a subject for discussion among manufacturers who have large plants and in one instance something of this nature has already been done.

The Seattle Machinery Co., 1779 Powers Street, Cincinnati,

is in the market for one 75 to 100-kw., d.c., 270 volt, belt type generator with a speed of 600 to 1200 r.p.m. New or used equipment in good condition will be considered. It is also in the market for a number of small automatic gear cutters for cutting cotton mill spur gears from 1 1/4-in. to 10-in. diameter. Gears to be cut are 5 pitch. Rapid and accurate work is essential.

The National Cash Register Co., Dayton, Ohio, is planning the erection of a five-story factory and also will make improvements on its school house and theater. Work will commence immediately.

The Mid-West Glass Co., 406 West Fourth Street, Cincinnati, has been incorporated with a capitalization of \$300,000 to manufacture automobile accessories. It has taken over the Herschede Glass Co. and the Daehn Glass Co. and will at once commence the manufacture of glass fixtures and a gasoline gage. Albert W. Erkins is president.

The Gartland-Haswell Foundry Co., Sidney, Ohio, has been incorporated with a capitalization of \$10,000. The foundry has been operated as a partnership and the change to incorporation is made merely as a matter of business convenience. J. C. Haswell, Dayton, Ohio, is president.

The Ohmer-Fare Register Co., Dayton, Ohio, which recently went into production on the Ohmer Truck Auditor, is not contemplating immediate extensions to its plant, according to officials of the company. It is possible, however, that in the near future it will be necessary to enlarge its capacity.

The Central South

ST. LOUIS, Feb. 6.

The Board of Public Improvements, City Hall, Hannibal, Mo., has plans under way for a municipal electric light and power plant, estimated to cost about \$170,000. The Arnold Co., 105 South La Salle Street, Chicago, is engineer.

The Derby Oil Co., Wichita, Kan., has work under way on a new oil refinery to cost about \$500,000, including machinery.

The Lee Mfg. Co., Vandalia, Mo., manufacturer of automobile tire chains, has acquired property at Jefferson City, Mo., and contemplates the removal of its plant to this location. The present works will be enlarged at the new location. Ralph Knox is president.

The City Council, Parsons, Kan., will soon call for bids for a new steam-operated power plant, to be used in connection with the waterworks system. Burns & McDonnell, 402 Inter-State Building, Kansas City, Mo., are consulting engineers. F. W. Frye is city clerk.

The Arctic Dairy Products Co., 415 West Sixteenth Street, Kansas City, Mo., is arranging for the erection of a new ice manufacturing plant, with initial capacity of about 2500 tons, estimated to cost about \$45,000.

The Crane Enameling Co., Chattanooga, Tenn., recently formed as a subsidiary of the Crane Co., 835 South Michigan Avenue, Chicago, with capital of \$1,500,000, has acquired the Cahill Iron Works and the Mutual Enameling Co. both of Chattanooga, and will merge the interests with its organization. The purchasing company will operate both plants, comprising the new factory of the Mutual company in the Alton Park section, which will be used as the principal manufacturing unit, and the Cahill plant on Chestnut Street. Employment is now given to about 400 men. R. T. Crane, Jr., head of the parent company, is president of the consolidated organization.

A vocational department will be installed in the new two-story and basement high school, 97 x 130 ft., to be erected at Preston, Kan., estimated to cost about \$85,000. The contract has been let to George E. Dalton, Junction City, Kan. H. A. Noble, 411 Reliance Building, Kansas City, Mo., is engineer.

The Common Council, Altus, Okla., is arranging for the establishment of a municipal electric power plant to cost about \$115,000.

The Standard Crate & Filler Co., Jefferson City, Mo., recently organized with a capital of \$1,500,000, has acquired the plant of the J. M. Hays Wood Products Co., and will operate it as the first unit of its works. About 50 acres has been secured and plans are being prepared for the erection of an adjoining works to manufacture strawboard and kindred products, estimated to cost about \$400,000, including machinery. A. W. Happy is general manager.

The Southern Refrigeration Co., Unika Bank Building, Johnson City, Tenn., has preliminary plans under way for a new three-story ice-manufacturing and cold storage plant, 100 x 100 ft., estimated to cost \$200,000, including machinery.

The Common Council, Hutchinson, Kas., is having plans prepared for the erection of a one-story automobile service

and repair building for municipal cars, estimated to cost about \$50,000. R. B. Lee, City Hall, is engineer in charge.

A vocational department will be installed in the new high school to be erected at Wichita, Kan., for which \$1,000,000 in bonds have been voted. Lorenz Schmidt & Co., 121 North Market Street, architects, will prepare plans. J. L. Leland is city clerk.

The American Commercial Car Co. of Gratiot and French streets, Detroit, will build two additions to the building recently acquired at Knoxville, Tenn., for a branch plant, to be 62 x 125 ft. and 62 x 100 ft. respectively, estimated to cost about \$30,000. Bids will be taken at once. R. F. Graf & Sons, Knoxville, are architects and engineers.

The Board of Education Library Building, Kansas City Mo., has taken bids for a new four-story and basement manual training school 110 x 11 ft. in connection with the present high school building. C. A. Smith, 602 Finance Building, is architect. T. R. Jackson is secretary of the board.

Following the approval of a bond issue for \$300,000 at a recent special election, the City Council, Lawton, Okla., will soon select an engineer to prepare plans for the proposed municipal electric power plant and extensions in the distributing system. J. M. Haynes is secretary of the council.

The American Lumber Products Co., St. Louis, is in the market for a second-hand 1000-1250 or 1500 kw turbine with condenser in good condition. Ley P. Rexford is president and general manager.

Milwaukee

Milwaukee, Feb. 6

The machine tool trade is undergoing an appreciable revival of buying interest and while the volume is by no means large or satisfactory, nevertheless inquiry of the past 10 days has been much more encouraging than at any time since the middle of December. The automotive industries seem to be manifesting greatest interest due doubtless to the favorable impression made upon consumer by price reductions and the effect of the midwinter exhibitions, which is reflected by greater activity in local automotive parts industries, this being one of the principal centers of this character in the United States. Sales of milling machines are still few and far between, the bulk of business now passing being in lathes, boring mills, drill presses and grinders. Foundries here are steadily making small increases in working forces to handle new orders which, however, are spotty and irregular rather than on an extended contract basis leaving vacancies off and on in operating schedules.

The Green Bay, Wis., Warehouse & Cold Storage Co. has let a contract to the L. M. Hansen Co., local contractor, for the general construction of a new cold storage warehouse and refrigerator plant estimated to cost \$100,000 at Broadway and the Chicago & Northwestern Railroad tracks. The order for refrigerating machinery and equipment will be placed within a short time. The warehouse will be occupied by Armour & Co., Chicago, and five other concerns.

The Perfect Pump & Mfg. Co., Marshfield, Wis., has been granted a charter to manufacture and repair pumps, machinery, appliances, etc. It is incorporated with \$25,000 capital stock by Vernon Burr, F. L. Grube and Hugh W. Goggins. An experimental shop has been conducted for some time and will be enlarged into a manufacturing plant.

The Eagle Mfg. Co., Appleton, Wis., manufacturer of tractors and feed cutters, at its annual meeting voted to engage in several other lines of power farm operating equipment which it is now developing. For the present only a small quantity of new tools will be required but later larger needs are expected to appear. A. W. Priest is president and Charles Hagen, general manager.

The Fossenden Mills Co., Sheboygan, Wis., has been organized with \$5,000 capital stock by Louis P. Fossenden, Harry P. Ellis and J. B. Fossenden to manufacture pressure governors and similar appliances for controlling steam, gas and air. Steps will be taken at once to provide manufacturing and assembling quarters in Sheboygan.

The Richter Mfg. Co., Highland, Wis., manufacturer of adjustable farm gates and similar agricultural specialties will incorporate its business with \$25,000 capital following the entrance of William Gabel and Frank Wepking as part owners. The present factory will be doubled in size early in the spring.

The Advance Auto Body Co., Milwaukee, has been incorporated with a capital stock of \$100,000 to manufacture and repair automobile bodies. The incorporators are John A. Dietrich, Julian Olds and Howard T. Foulkes, attorneys, 31 Mason Street, representing interests whose identity will not be revealed until the enterprise reaches maturity.

The Safety Traffic Light Co., Milwaukee, has been

organized by Richard F. Dawson, 226 Myer Avenue, and Walter W. Lange, president South Side Machine Co., 14th and Windlake avenues, to manufacture a patented dome light of counter-balanced design. Temporary offices have been opened at 425 East Water Street.

The Purcell-Wischan Co., Madison, Wis., automobile dealer, has let the general contract to Klug & Smith, consulting engineers, Mack Block, Milwaukee, for the erection of a public garage, sales and service building, 100 x 121 ft., two stories and basement, estimated to cost \$75,000. The machine shop will occupy a space, 60 x 100 ft., and will require a miscellaneous equipment of shop tools, fixtures, etc.

The Merrill Buick Co., Merrill, Wis., has plans for a new sales and service building, 57 x 125 ft., part two stories and basement, to be ready June 1. It will cost about \$25,000 complete.

The S. W. Miller Piano Co., Sheboygan, Wis., which disposed of its factory several months ago to the Sheboygan Fibre Furniture Co., to facilitate the expansion of the latter concern, has purchased a new site at Washington Court and Niagara Avenue, 108 x 600 ft., and will start work at once on the erection of a one-story brick and concrete factory, 56 x 108 ft., as a first unit of a new plant. In the meantime it is continuing production in a part of the original plant, which must be vacated May 15.

The Lincoln Warehouse & Auction Co., 226 Fourth Street, Milwaukee, has plans by G. H. Leopold, architect, 189 Martin Street, for a six-story, reinforced concrete, brick and steel building, 120 x 180 ft., at Third and Prairie streets, to cost \$250,000. It will require fire doors, steel sash, elevators, conveyor systems, boilers, etc.

The American Metal Products Co., Milwaukee, which recently completed its new brass and bronze foundry with electric furnace equipment at Thirty-third Avenue and Burnham Street, is engaging in quantity production of a poppet valve for internal combustion engines made from Ampco bronze, a patented process. It will continue to make bronze castings by this formula as well as bearing metals, impellers, etc. Carl J. Zaiser is general manager.

Arthur Sedenschwartz, architect, 125 East Water Street, Milwaukee, is taking bids in behalf of an unidentified interest for the construction of a public garage and repair shop, 100 x 170 ft., part two stories and basement at Fifth and Cherry streets. It will cost about \$50,000.

The Three Lake Wis. Board of Education has let the general contract to Hugo V. Heitling Inc., Manitowoc, Wis., for a new high school with manual training department, estimated to cost \$125,000. Oppenhamer & Obol, Wausau, Wis., are the architects.

The Invaluable Metal Furniture Co., Manitowoc, Wis., contemplates the erection of an addition to its factory which will increase its capacity from 50 to 75 per cent by June 1. The present plant is overcrowded with orders and more room is needed at once. At the annual meeting John Schutte was elected president to succeed Louis Schutte. M. Strauffacher, Monroe, Wis., was re-elected secretary, George Alter, treasurer and P. M. Wege, vice-president.

The Board of Education, Del Per, Wis., is taking sealed bids until Feb. 25 for a new \$200,000 high school which will contain vocational training facilities. The architects are Foeller Schobel & Stephenson, Green Bay, Wis.

The Allin-Duffenbaugh Wrench Co., Baraboo, Wis., manufacturer of patented wrenches and tools for machine and automotive shops, has booked several large jobbing orders which will keep the plant busy for more than 60 days. The line is being enlarged to embrace pipe wrenches up to 4-in. capacity. The shop equipment is being increased gradually to meet new demands.

Walter S. Woods, consulting engineer, LaCrosse, Wis., is taking bids in behalf of Dr. E. C. Swartout, 904 Rose Street, LaCrosse, for the construction of a 16-ft. concrete dam 166 ft. long remodeling the power house, and installing new dynamo switchboards, waterwheels, etc., at West Salem near LaCrosse. The work will cost about \$65,000 complete.

The Little Wolf Lumber Co., Manawa, Wis., will build a new hydro-electric power plant, with auxiliary steam equipment at an estimated cost of \$25,000. The work is in charge of Thomas W. Orbison, consulting engineer, 312 College Avenue, Appleton, Wis.

The Beaver Dam, Wis., Board of Education will take bids about March 1 for a two-story fireproof high school building, L-shaped, 7 x 139 and 30 x 130 ft., designed by Parkinson & Dockendorf, architects, LaCrosse, Wis. It will cost about \$300,000. George E. Ray is superintendent of schools.

The Simplicity Engine & Mfg. Co., Port Washington, Wis., has put into production a portable engine and pump.

new design and containing two approved methods of fitting new engine blocks with new pistons. It is designed principally for garage and repair shop use.

The Standard Mfg. Co., Appleton, Wis., manufacturer of wood products, has increased its capital stock from \$80,000 to \$150,000. It is building a new sawmill costing about \$75,000 with machinery and equipment. R. O. Schmidt is president and general manager.

Pittsburgh

PITTSBURGH, Feb. 6.

As far as inquiries are concerned, there is a fairly active market in machine tools in this district, but sales so far this month are not showing up much better than January, which, with most of the trade, was a disappointment. One dealer reports the sale of a 24-in. Steptoe shaper for shipment to Butler, Pa., and a 31-in. motor-driven Rockford drilling machine to go to Shreveport, La. The U. S. Electrical Tool Co. has sold a 5-hp. heavy floor grinder to the Oil Well Supply Co. for shipment to Tulsa, Okla., and three grinders to the Westinghouse Electric & Mfg. Co. for installation at its Springfield, Mass., works. All bids against the 22 tools inquired for several months ago for the Western Penitentiary have been rejected, and it is now proposed to buy the tools as they are wanted. The Wheeling Steel Corporation has a list out for about 20 tools for its new rod and wire mills being constructed at its Portsmouth, Ohio, works and is expected to issue the list soon against the tools which will be wanted in connection with the improvements now in progress at Steubenville, Ohio. The crane market is almost stagnant. There are occasional requests for prices for estimating purposes, but new inquiries are lacking. It does not seem to be a question of price on either machine tools or cranes that is blocking sales. In both classes of equipment prices named are down to actual costs, and in some instances even lower, but prospective buyers do not seem to be willing to spend money at the present time and seem to believe they will be able to save on freight charges later. The borough of Tarentum, Pa., has placed the order for a 2,000,000-gal. pumping engine with the Worthington Pump & Machinery Corporation.

H. R. Eicher, House Building, Pittsburgh, is inquiring for a crane, steam or electric, 7 to 10 tons capacity, 35 ft. boom, with clamshell bucket, $\frac{3}{4}$ to 1-yd. capacity, straight traction or caterpillar trucks, with boiler and appurtenances.

The Standard Motorcar Co., Pittsburgh, has been organized by interests connected with the Standard Steel Car Co., Frick Building, to take over the manufacture and sale of the automobile branch of the latter organization. Operations will be conducted as heretofore and general expansion is planned. Don C. McCord has been elected vice-president of the new company, in charge of finance and sales, resigning a similar position with the Bankers' Commercial Securities Co., 19 West Forty-fourth Street, New York.

The Greenwood Construction Co., Terminal Building, Pittsburgh, has awarded contract to Walker & Curley, Farmers' Bank Building, for a new one-story mechanical shop, 62 x 120 ft. and 86 x 165 ft., at Carson and Twenty-fourth streets, estimated to cost in excess of \$60,000.

The West Penn Power Co., Pittsburgh, will increase the capacity of its Windsor power plant, Beech Bottom, W. Va., with the installation of two new 30,000-kw. turbo-generators and auxiliary operating equipment, estimated to cost in excess of \$3,000,000, including line construction. The company is also planning for extensions in its Springdale power plant with new equipment to effect a combined generating capacity at all plants of close to 190,000 kw.

The Corry-Jamestown Mfg. Co., Corry, Pa., manufacturer of metal furniture, is considering plans for an addition to its plant. D. A. Hillstrom is local manager.

The Lundale Coal Co., Lundale, W. Va., is planning for the construction of a new tipple in the vicinity of Three Forks, W. Va., including the installation of electrically operated and other mining machinery. The proposed work is reported to cost in excess of \$500,000. George M. Jones, general manager, is in charge.

A vocational department will be installed in the two-story and basement high school to be erected at Wayne, W. Va., estimated to cost about \$180,000. Holmbee & Fogue, Empire Bank Building, Clarksburg, W. Va., architects, are preparing preliminary plans. Herman P. Dean is secretary of the board.

The Williamson Supply Co., Williamson, W. Va., manufacturer of mine equipment and supplies, is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at about \$100,000.

The Hancock Steel Co., Martinsburg, W. Va., is completing operating work in connection with its new plant at Hancock, Md., plans for which have been held in abeyance for some months. It is expected to call for bids at an early date for the erection of the first unit, comprising a one-story

foundry, to be followed by a machine shop. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer. F. Vernon Aist, Martinsburg, heads the company.

The Grasselli Chemical Co., Guardian Building, Cleveland, is planning for the construction of a new pumping plant in the Lost Creek, W. Va., section to cost about \$50,000, with machinery, for service at its plants at Grasselli and Meadowbrook, W. Va.

A vocational department will be installed in the junior high school, 72 x 219 ft., to be erected at West Charleston, bids for which are being taken up to Feb. 21. It is estimated to cost about \$150,000. Tucker & Patterson, Masonic Temple, are architects.

The Guyan Machine Shops, Logan, W. Va., are making inquiries for tools and operating equipment, including a turret lathe for brass bushing work; lathe for turning steel locomotive wheels; punch and shear to handle $\frac{1}{2}$ -in. plate; chain hoists, $\frac{1}{2}$ to 2-ton capacity; a quantity of shafting, steel and nickel, from 2 to 4 $\frac{1}{2}$ in. in diameter and metal lockers and tool racks for machine shops.

The Gulf States

BIRMINGHAM, Feb. 6.

The W. L. Lemly Foundry Co., Bessemer, Ala., manufacturer of iron pipe, etc., has acquired the Columbus Foundry Co., Columbus, Ga., manufacturer of similar products, and will merge the business with its organization. The pipe works at Columbus will be removed to the Bessemer plant.

The Common Council, Hitchcock, Tex., is planning for the installation of a municipal electric light and power plant to cost about \$50,000. A municipal ice-manufacturing plant is also planned.

A vocational department will be installed in the new high school to be erected at Stamford, Tex., estimated to cost about \$80,000. N. S. Holland is superintendent of schools.

Fire, Jan. 27, destroyed a portion of the oil refinery of the Terrell Cotton Oil & Refining Co., Terrell, Tex., with loss estimated at about \$50,000, including equipment. It is planned to rebuild. Grover G. Fix is general manager.

The Galveston-Houston Electric Co., Houston, Tex., has arranged for a bond issue of \$1,700,000, a portion of the proceeds to be used for plant extensions and improvements.

The Edwards Mfg. Co., 529-49 Eggleston Avenue, Cincinnati, manufacturer of sheet metal products, has completed plans and will soon break ground for its proposed new branch factory at Dallas, Tex., to be three stories, 100 x 200 ft., and estimated to cost about \$60,000. James F. Agnew is manager in charge.

The Texas Utilities Light & Power Co., Lubbock, Tex., is having plans prepared for rebuilding its local electric light and power plant, recently destroyed by fire.

The Humphreys-Pure Oil Corporation, Mexia, Tex., will commence erection early in the spring of its new oil refinery at Port Neches, Tex., to have an initial output of about 40,000 bbl. per day. Col. E. A. Humphreys is head.

The Massey Concrete Products Co., Dallas, Tex., is arranging for the erection of an addition to cost about \$200,000, including machinery. Plans will be prepared at an early date.

The Florinda Mill & Planing Co., Sumica, Fla., has completed plans for a new factory to cost about \$100,000, with machinery, to replace its works recently destroyed by fire. The installation will comprise planers, saws, matchers, etc., to provide for a daily output of about 35,000 ft. of timber. W. J. Fink is manager. G. F. Hausorman is construction engineer.

The Orleans Steel Products Co., 1021 Bienville Street, New Orleans, is making inquiries for power crankshaft grinding machines and attachments, and other equipment for automotive work.

The City Council, Orlando, Fla., is completing negotiations with the Orlando Water & Light Co. for the purchase of its local plant, to be operated in the future as municipal property. Extensions and improvements will be made and new equipment installed.

The Pacific Coast

SAN FRANCISCO, Jan. 31.

The Day & Night Solar Heater Co., Monrovia, Cal., will commence the immediate erection of a new one-story plant at Shamrock Street and Foothill Boulevard, for the manufacture of heaters and heating equipment, estimated to cost about \$30,000.

Grace Brothers, Santa Rosa, Cal., are having plans prepared for a three-story, reinforced-concrete addition to their ice-manufacturing and refrigerating plant, 60 x 75 ft.

Fire, Jan. 21, destroyed a portion of the plant of the Los Angeles Enameling & Wapanning Co., 118 East Ninth Street, Los Angeles, with loss estimated at close to \$20,000. The works will be rebuilt.

The American Refrigerating Co., Redondo, Cal., has preliminary plans under way for a new ice-manufacturing and refrigerating plant at Anita Street and the Camino Real, estimated to cost in excess of \$50,000.

Fire, Jan. 26, destroyed the power house of the Southern California Edison Co., Los Angeles, at Los Alamitos, Cal., with loss estimated at about \$75,000. It will be rebuilt.

The City Refrigerator & Fixture Co., Los Angeles, manufacturer of refrigerators, metal fixtures, etc., has had plans prepared for a new one-story plant, 40 x 135 ft. O. M. Warner, 220 Stinson Building, is architect.

The California Motor Car Co., Richmond, Cal., manufacturer of automobiles and occupying a temporary plant, has preliminary plans under way for the first unit of its new works on about six acres, recently acquired at Martinez. A main machine shop will be constructed, estimated to cost about \$45,000, and of which amount approximately one-half will be expended for machinery.

A vocational shop building will be erected at the new group of high school buildings to be erected by the Board of Education, Whittier, Cal., estimated to cost about \$525,000. Preliminary plans are being prepared by Myron Hunt, 1107 Hilberian Building, Los Angeles, architect.

The Santa Fe Railway Co., Kerckhoff Building, Los Angeles, will commence the immediate erection of a new ice-manufacturing and railroad refrigerator car precooling plant at Riverbank, Fresno County, comprising a main building, 146 x 170 ft., with extensions, 86 x 134 ft., and a number of smaller structures. A cooling tower, 45 x 98 ft., will be constructed.

The City Council, Eugene, Ore., has tentative plans for a municipal hydroelectric generating plant on the McKenzie River.

M. F. Buchman, Seattle, care of Thompson & Thompson, Mutual Life Building, architects, is having plans prepared for a new one-story machine shop at Seventh Avenue and Broad Street, estimated to cost about \$15,000, exclusive of equipment.

James Lindsey, 438 Worcester Building, Portland, Ore., and associates are planning the erection of a hydroelectric generating plant in the Marion Lake district, near Salem, Ore., estimated to cost about \$225,000.

Canada

Toronto, Feb. 6.

A better buying movement is steadily making its appearance in this market, some dealers having booked fair sized orders during the week. Within the past few days dealers have closed orders for a number of tools for the Durant Motors, Ltd., which is equipping its plant at Leaside, Toronto, and it is expected that further buying will be done by this concern in the early future. The lists continue absent from the market, but there is a fairly active demand for one or two machines from buyers spread over a wide territory. Equipment makers state business is becoming stronger and several have recently added to their working staffs. The demand for small tools is also making headway and dealers handling these lines report good business.

The Ontario Creameries, London, Ont., are in the market for complete refrigeration and ice-making equipment, estimated to cost \$30,000.

Merlin, Ont., plans to spend \$28,000 on a power and light distributing plant.

Walkerton, Ont., will erect a power distributing station and install equipment to cost \$10,000.

The City Council, Collingwood, Ont., is asking for prices on motor generator and storage battery, to replace a wet battery system.

Warton, Ont., plans improvement to its water pumping plant including the installation of an electrically operated pump and large gasoline engine. Prices are asked on equipment estimated to cost \$25,000.

Baker & Redden, Thomas Street, Windsor, N. S., will build a sash and door factory and are receiving prices and information regarding equipment.

The factory owned by the Leggett & Platt Bed Spring Co., 228 McDougall Street, Windsor, Ont., was recently damaged by fire with a loss of \$12,000.

The United States Hoffman Machinery Corporation, manufacturer of sanitary steam clothes pressing machinery, with its main office in New York, has a plant at Syracuse, N. Y., and has been in existence for the past 12 years, first under the name of T. D. Palmer Co., and later under the name of United States Hoffman Co., and United States Hoffman Machinery Co.

OFFICE CHANGES

W. E. Hopton, the Hopton Co., White Memorial Bldg., Syracuse, N. Y., with branch office at Rochester, N. Y., has been named selling agent in New York State with exception of New York City and territory south of Albany, for the Atlas Car & Mfg. Co., Cleveland, manufacturer of storage battery locomotives and trucks, electric locomotives and cars, complete equipment for industrial railroads including dryer cars, transfer cars, turntables, specially designed cars for rolling mills, mines, factories and plantations and by-product coke plant equipment.

The Chillingworth Engineering Corporation, 143 Liberty Street, New York, announces that it has associated with it Frank H. Plum, Herbert Pluemer, George E. Mellin and Harold Von Thaden, formerly of the C. W. Hunt Engineering Corporation, and with the consent and approval of the Hunt corporation will carry on a business of a character similar to that conducted by the latter.

The general offices of Pneumercator Co., Inc., have been removed from 15 Park Row, New York, to Sperry Building, 40 Flatbush Avenue Extension, Brooklyn.

On April 1 the Barrett-Cravens Co. will move to its new four-story factory recently acquired at Monroe and Thropp streets, Chicago.

The Homestead Sales Corporation, 242 Lafayette Street, New York, has been appointed sole agent for New York and vicinity by the General Specialty Co., Buffalo, N. Y., in the sale of its torpedo tube cleaner and other boiler cleaning specialties. E. E. Jones, manager Homestead Sales Corporation, reports a reviving interest in the valve and steam specialty line. This company is now handling the following lines: Homestead valves, General Specialty Co.'s line of tube cleaners, Atlas valves and steam specialties.

The Rathbun Jones Engineering Co., Toledo, Ohio, has appointed the Ingersoll Rand Co., New York, general sales agent for Rathbun gas engines. These engines are well known to the trade. They are of the vertical, multi-cylinder type and are built to operate on natural, illuminating, producer, coke oven, oil still and other forms of gases which can be successfully handled in an internal combustion engine. Sizes range from 100 brake hp. to 1450 brake hp.

Coleman-Shoemaker, Inc., Philadelphia, now occupies its new plant at Twentieth and Clearfield streets, where it has a railroad siding and overhead crane. This makes it possible to render greater service in handling machinery.

The Blairsville Iron Works has been sold to a new corporation, which will be known as the Conemaugh Iron Works Co., with general offices at Latrobe, Pa., and works at Blairsville, Pa. The company makes split ingot molds, stools and gray iron castings.

Iron Trade Products Co., Farmers Bank Building, Pittsburgh, has taken over for a period of years the exclusive sales agency for the Seenor Coal Mining Co., operating 800 acres of low volatile coal; mine known as Heckler Mine, Seenor Station, Somerset County, Pa., Pennsylvania Railroad, Group 1. This is a Pool 9 low volatile coal.

The name of the Globe Steel Co., Mansfield, Ohio, has been changed to the Globe Iron-Crush & Shot Co.

E. F. Whitaker has become associated with Frank W. Trabold, 30 Church Street, New York, to serve as direct agent of Armstrong Bros. Tool Co., Spicer Mfg. Co., the Bronzo Alumina Co. and the Cleveland Abrasive Wheel Co., Cleveland. A new safety hoist hook will be distributed.

Pittsburgh office of Briggs & Turivas, Inc., Chicago, iron and steel scrap, has been removed from 911 Union Arcade to 427 Oliver Building. T. S. Downing is manager.

Youngstown Boiler & Tank Co. Meeting

Last year the Youngstown Boiler & Tank Co., Youngstown, Ohio, operated an average of 80 per cent., shareholders were informed Jan. 26 at the annual meeting. At present operations are not in excess of 65 per cent. The company has a force of about 50 erectors in the field. It manufactures tanks and fabricates steel work.

The company now has in course of erection four 50,000-bbl. oil storage tanks in the South-West for an oil refining interest.

These directors were elected—James P. Keene, William H. Heywood and Charles R. Vogel of Youngstown; E. I. Ingalls of Birmingham, Ala. and E. D. Patterson of Toledo, Ohio. Directors elected the following officers—President, James P. Keene; vice-president, E. I. Ingalls and treasurer, Charles R. Vogel.

IRON AND STEEL STOCKS

Prices for Grains May Have Been a Sustaining Factor

Most of the steel shares have been in better demand of late and prices for them have ruled firm. Reasons for the better demand are not clear. Quarterly earnings statements, issued recently, while indicating a turn for the better has come in the steel industry, disclose little more. Incoming business is not of sufficient volume to materially increase mill production. Nothing has been said recently regarding mergers of steel properties but what already is known. Higher prices quoted for wheat, corn and oats represent greater buying power of farmers and increased railroad earnings. Possibly there is some connection between grain and steel share quotations.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal., com., 41 1/2-46 1/2	Lackawanna St., 45 1/2-47 1/2
Allis-Chal., pf., 90 1/2-92	Midvale Steel, 28 1/2-30 1/2
Am. Can., com., 36 1/2-38 1/2	Nat. Acme, 11 1/2-12 1/2
Am. Can., pf., 95-98	Nat. El. & S. com., 35 1/2-37 1/2
Am. C. & F., com., 144 1/2-146 1/2	N. Y. Air Brake, 57-58 1/2
Am. Loco., com., 104 1/2-108 1/2	Nova Scotia St., 25 1/2-27 1/2
Am. Loco., pf., 113 1/2-114	Pitts. Steel, pf., 63 1/2-65 1/2
Am. Rad., com., 82-83	Pressed St., com., 63 1/2-65 1/2
Am. St. Ed., com., 30 1/2-32 1/2	Pressed Steel, pf., 63-65
Am. St. Ed., pf., 94-94 1/2	Ry. St. Sp., com., 95 1/2-98
Bald. Loco., com., 94 1/2-102 1/2	Ry. St. Sp., pf., 112-112 1/2
Bald. Loco., pf., 106-106 1/2	Republic Steel, 41-41 1/2
Beth. Steel, com., 55-57 1/2	Sloss, com., 41-41 1/2
Beth. Steel, Class B, 59 1/2-62	Superior Steel, 28 1/2-30
Beth. St., 8% pf., 106 1/2-108	Tranau-Williams, 32 1/2-34
Chl. Pneu. Tool., 59-64 1/2	Un. Alloy Steel, 26 1/2-28
Colo. Fuel, 25 1/2-26 1/2	U. S. Pipe, com., 17-19 1/2
Crucible St., com., 59 1/2-62 1/2	U. S. Pipe, pf., 56-58 1/2
Crucible St., pf., 80-82	U. S. Steel, com., 84 1/2-87 1/2
Gen. Electric, 142-148	U. S. Steel, pf., 115 1/2-117 1/2
Gr. No. Ore Cert., 31 1/2-34	Vanadium Steel, 32 1/2-35 1/2
Gulf States Steel, 66-74 1/2	Va. T. C. & Coke, 80-84
Int. Har., com., 81 1/2-83 1/2	Westinghouse El., 50 1/2-53 1/2

Midvale Steel & Ordnance Co. Deficit

The Midvale Steel & Ordnance Co. reports for the quarter ended Dec. 31, last, net income after taxes of \$828,358, compared with \$688,238 in the preceding three months, and with \$4,778,127 in the final quarter of 1920. After depreciation there was a deficit of \$1,379,782, contrasted with a deficit of \$1,249,136 in the September quarter, and with a balance for dividends of \$2,056,724, equal to \$1.03 per share on the stock in the last quarter of 1920. The statement follows:

	Fourth Quarter, 1921	Third Quarter, 1921	Fourth Quarter, 1920
Net after taxes.....	\$828,358	\$688,238	\$4,778,127
Bond interest.....	744,848	745,048	762,128
Balance.....	\$83,510	\$56,810	\$4,015,999
Depreciation res....	1,463,292	1,192,326	1,959,275
Deficit.....	\$1,379,782	\$1,249,136	\$2,056,724

*Deficit. †Balance

Based on the quarterly reports the company for the year ended Dec. 31 last, shows net after taxes of \$2,624,697, compared with \$21,924,650 in 1920 and with \$19,345,840 in 1919. After depreciation reserve there was a deficit of \$5,313,513, contrasted with a balance of \$12,371,298, equal to \$6.18 per share in 1920, and with \$10,387,418, equal to \$5.19 per share in 1919. Comparisons follow:

	1921	1920	1919
Net after taxes.....	\$2,624,697	\$21,924,650	\$19,345,840
Bond interest.....	3,005,622	3,078,531	3,141,569
Deficit.....	\$380,925	\$18,851,119	\$16,204,331
Depreciation res.....	4,932,588	6,479,821	5,816,513
Deficit.....	\$5,313,513	\$12,371,298	\$10,387,418

†Balance.

Report of Newton Steel Co.

Gross sales of the Newton Steel Co., Youngstown, Ohio, in 1921, were \$2,872,866, according to the annual report submitted Feb. 1 to stockholders. Present unfilled orders are sufficient to enable normal production for 60 days, coming principally from the automobile industry. The company showed a gross profit last year of \$365,837 and a net profit of \$29,047 after all reserve charges, taxes and miscellaneous claims. After paying the annual 7 per cent dividend on \$705,000 of outstanding preferred stock the company reported a deficit of \$15,444. Average operations last year were at 60 per cent. For two months the company's plant was wholly suspended. Directors, who were re-elected, are Edward F. Clark, H. M. Steele, J. H. Fitch, Jr., W. H. B. Ward, H. A. Taylor, and W. F. Ward and George T. Fitch. Officers are Edward F.

Clark, president and general manager; H. M. Steele, vice-president in charge of operations; J. H. Fitch, Jr., vice-president in charge of sales, and R. A. Kenworthy, secretary and treasurer.

The company's plant, located on a 150-acre tract at Newton Falls, Trumbull county, consists of eight stands of roughing mills and eight stands of finishing mills. It is entirely electrically driven and so built that extensions may be efficiently made when required. The company manufactures special high grade sheets for the automobile, metal furniture and Pullman trades. It has capacity for 50,000 tons of finished product annually.

Lake Erie Bolt & Nut Co. Plans

In order to provide additional working capital stockholders of the Lake Erie Bolt & Nut Co., Cleveland, are being advised of a refinancing plan to permit the company to take advantage of a new lease on the present plant and to supply it with funds for operating purposes. It is proposed to change the present company from a Delaware to an Ohio corporation and to make the authorized capital stock 70,000 shares of new par stock, \$10.00 of which will be issued at this time. Present stockholders will receive four shares of the new stock for one share of the present preferred stock and the payment of \$42. With no cash payment the exchange will be made share for share. Holders of common stock will receive one share of new stock for each 100 shares of present common stock. A meeting of the stockholders will be held Feb. 9 to vote on the refinancing plans.

Industrial Finance

Between 98 and 99 per cent of the stockholders of the American Brass Co. have turned in their stock for the merger with the Anaconda Copper Co.

The directors of the Saco Lowell Shops, Boston, textile machinery, have recommended an increase of \$1,762,500 in the common share capitalization for the purpose of paying a stock dividend of 50 per cent to owners of common shares. Stockholders will act on the recommendation Feb. 15.

Edmund Wolfe, president First Bridgeport National Bank, and Elmer Havens, president Locomobile Co., Bridgeport, Conn., automobiles, have been made temporary receivers for the Locomobile Co.

The Kerite Insulated Wire & Cable Co., Seymour, Conn., has issued \$150,000 additional stock, bringing the capitalization up to \$350,000. The new capital will be used to raise money for working capital and to reduce current indebtedness.

The directors of the American Rolling Mill Co., Middletown, Ohio, at their January meeting took no action on the stock dividend that it has been customary to declare. Members of the board expressed the opinion that it would be inadvisable to increase the stock of the company by such a dividend at this time in view of the general unsettlement in industrial and financial conditions.

The Folsom-Miller Co., Markesan, Wis., manufacturer of washing machines, has filed a voluntary petition in bankruptcy. Schedules claim assets of \$32,533 and admit liabilities of \$132,966.67, of which \$60,345 is due Guy Miller, treasurer, and \$59,153 to S. P. Folsom, president, for payment of corporation debts and money advances.

Articles of dissolution have been filed by the Oshkosh Tractor Co., Oshkosh, Wis., a Wisconsin corporation with \$1,200,000 capital stock, organized a year ago to take over the business of the LaCrosse, Wis., Tractor Co.

The Brazil Trust Co., Brazil, Ind., has been appointed receiver for the Union Steel Mfg. Co., which moved its plant to Brazil from Chicago about a year ago and manufactures tools and automobile parts.

The Truscon Steel Co., Youngstown, Ohio, is now paying 17 1/2% per share quarterly on its common stock, or at the annual rate of 7 per cent, as compared with 40c, or a yearly dividend rate of 16 per cent.

Business of the William P. Pollock Co., fabricating interest of Youngstown, Ohio, was in excess of 50 per cent of capacity last year, according to statement at the annual meeting. At present the company's capacity is idle. Directors re-elected are: Porter Pollock, W. G. Wilson, John Kirby, J. H. Warne, Alexander Best, Harry Payne and Edgar J. Reilly. Directors elected these officers: President and treasurer, W. G. Wilson; vice-president and general manager, J. H. Warne; vice-president and general superintendent, John Kirby and secretary, Alexander Best.

The Struthers Furnace Co., Cleveland, Ohio, operating a merchant blast furnace at Struthers, Mahoning County, Ohio, paid its quarterly preferred dividend Feb. 1 of \$1.75 per share. The company was founded in 1869 and has been under the same management for upwards of 35 years. It has no bonded debt and has never defaulted on its preferred dividend.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Bands, base price	3.13c.
Beams and channels, angles and tees	
3 in. x 3 in. and larger, base	2.63c.
Channel, angles and tees under 3 in. x 3 in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.50c.
(Smooth finish, 1 to 2½ x ½ in. and larger)	2.70c.
Tool-steel, ½ x ¾ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex.	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¾ in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C R, One Pass Per Lb.	Blued Steel Pipe Sheet Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	
Nos. 22 and 24	3.60c. to 3.85c.	4.10c.
No. 26	3.65c. to 3.90c.	4.15c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel			Wrought Iron		
	Black	Galv.		Black	Galv.
¾ in. Butt.	56	40	¾ in. Butt.	30	13
¾ in. Butt.	61	47	1½ in. Butt.	32	15
1-3 in. Butt.	63	49	2 in. Lap.	27	10
3½-6 in. Lap.	60	46	2½-6 in. Lap.	30	15
7-8 in. Lap.	56	34	7-12 in. Lap.	23	7
9-12 in. Lap.	55	33			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	21¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21c. to 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke	14-20	Primes	Wasters
	"AAA"	"A"				
	Charcoal	Charcoal				
	14x20	14x20				
1C.	\$10.00	\$8.50			80 lb.	\$6.05 \$5.80
IX.	11.25	10.00			90 lb.	6.15 5.90
IXX.	13.00	11.50			100 lb.	6.25 6.00
IXXX.	14.75	13.25			1C.	6.40 6.15
IXXXX.	16.25	15.00			IX.	7.40 7.15
					IXX.	8.40 8.15
					IXXX.	9.40 9.15
					IXXXX.	10.40 10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	\$7.00
1C.	7.25
IX.	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15¼c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5½c. to 6¼c.
Bar lead	6¼c. to 7 c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	22c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6¼c. to 6½c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	26c. to 28c.
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Old Metals

The market is weak and business is at a standstill. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light and bottoms	8.00
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	7.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, February 16, 1922

ESTABLISHED 1855

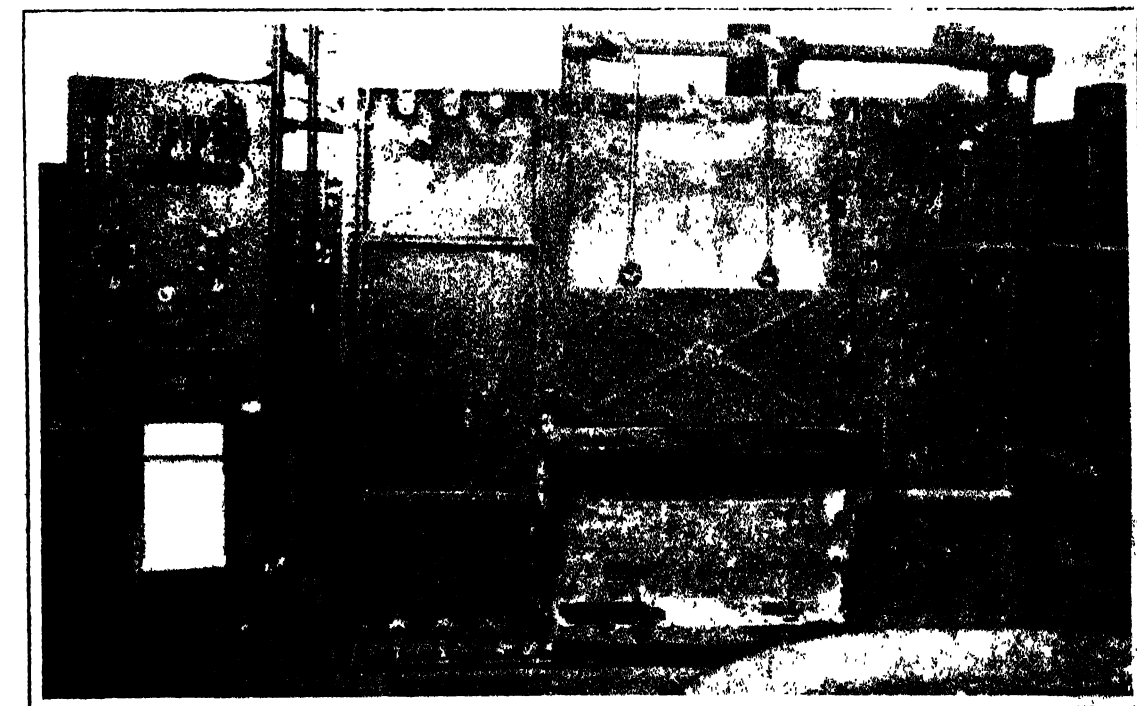
Over-all Cost of Heat-Treated Parts

Electric Current or Fuel Cost Is But a Portion of Total Cost
Percentage of Rejection Important—Cost of
Subsequent Operations an Item

BY C. L. IPSEN*

IN the development of the art of steel treating the advance has been associated with a progressive change from one type of heat source to another. It has passed from the early hand forge, burning wood or charcoal, successively through the coal and coke furnace, and finally to the electric furnace. It is especially noteworthy that each change in the development has been to a fuel or heat source having a higher cost. While these progressive changes have not been univer-

sally adopted, it is believed that they have been made on a sound economic basis, since there have been no backward tendencies. As the higher priced, improved heat source has successfully withstood the competition of existing fuels, it is evident that there are other factors of greater importance in the heat treatment of steel than furnace operating costs, a fact not commonly recognized by the average furnace user. Most prominent among these other factors are reduced cost of subsequent operations, reduction in the number of rejections, increased life of products, with more satisfactory service.



Electric Resistance Furnace with Panel and Instrument for Automatic Temperature Control

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To determine to what extent these factors will over-

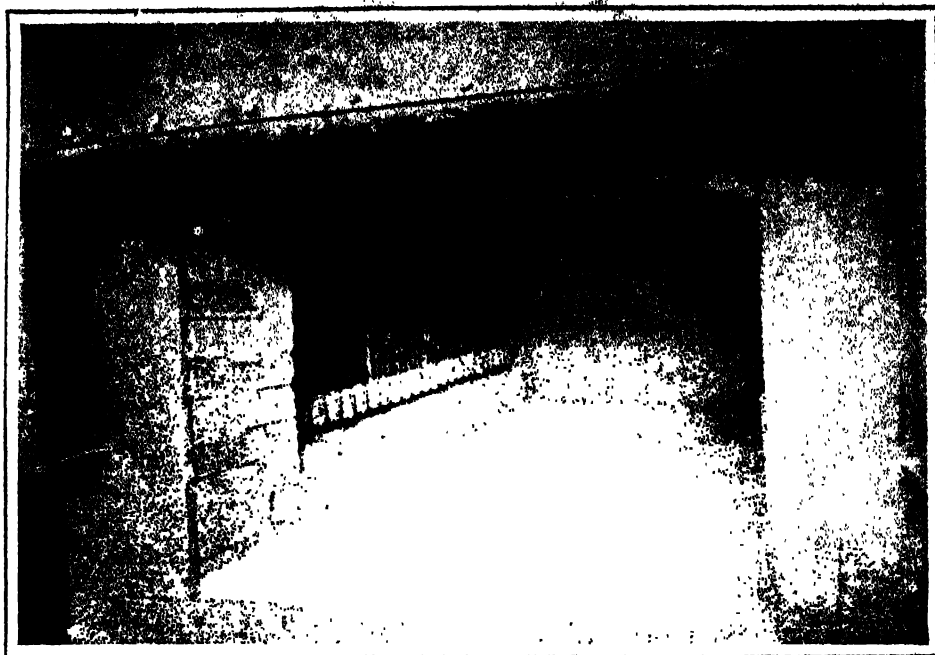
plays in the ultimate cost. The electric power rate for all items is taken at 12c. per kw-hr.

The various dies, items 1 to 6, were heated in the resistance furnace shown. A similar furnace is used for preheating, and an electrically heated oil bath is used for drawing. These furnaces, and the oil tempering bath, are maintained at constant temperature throughout the day, and the cost of the electricity thus used is apportioned among the dies treated over a certain period. If the furnaces could be operated at full capacity constantly, the cost of the electricity would be far below the values given.

This furnace has been run constantly for 25 months at a temperature of 1500 deg. Fahr. For the first nine months of the time it was run 24 hr. per day, 7

*Designing engineer, Industrial Heating Department, General Electric Co.

Interior of Electric Resistance
Carbonizing Furnace 36
In Wide 29 in High
and 79 in Deep. This
furnace requires 60
kw, 240 volts at 220
volts, to maintain a
temperature of 1700
deg. Fahr.



days a week. Since that time it has been run from 4 a. m. to 4 p. m., an automatic time clock being used

Cost Figures in Hardening and Drawing

Item	Part	Factory Cost of Parts	Cost of Heat Treating	Cost of Electricity in Per Cent of Total Cost
1	Segment combination die	\$1,380	\$13.50	\$1.16
2	Segment combination die	1,128	12.00	3.70
3	Round blanking die	638	5.03	1.50
4	Segment blanking die	782	9.45	2.92
5	Die	795	10.53	3.43
6	Die	875	8.66	2.67
7	Gear	234	13.00	3.70
8	Gear	243	15.00	4.44
9	Gear	338	21.00	6.25
10	Gear	391	26.00	7.60
11	Gear	450	30.00	9.06
12	Die block	110	1.75	0.65
13	Gear*	51	0.03	0.03
Totals of all above		\$7,101	\$165.92	\$50.11

*Hardening only, without drawing

†Estimated.

to throw the power on in the morning and off in the afternoon.

During the 24 months of operation there has been no interruption of service, and the only expense incurred has been the replacement of a relay coil on the

control panel, at a cost of less than one dollar. A metallic resistor heating element is used, of the construction shown in the interior view. No deterioration in this resistor is apparent after the 25 months' continuous service. The only attendance necessary is occasional oiling of the automatic control instrument, and putting in a roll of record paper; the controlling of the temperature, and the throwing on and off of the power, being entirely automatic. Thus the electric cost, as indicated in the table, is the only expense incurred; there is no continuous repair bill.

Thus the total cost of electricity in heat treating these dies amounts to 2/3 of 1 per cent of the ultimate cost of the dies. Subtracting from this the cost of other kinds of fuel will give the amount that must be offset by the other factors, such as the reduction of rejections, etc. In the case of this die heating furnace, the cost of electricity is practically the same as the cost of oil. Extensive tests were run on similarly constructed oil and electric furnaces to determine the policy of the General Electric Co. on future tool treating furnace installations. The cost of operating the oil furnace was 23c. per hr. with oil at 13c., and the electric furnace 10c. per hr. With oil at its present level, the costs are about equal.

In certain localities this would not be the case, and we must then look to the other features to justify the use of electric furnaces. In the case of these dies the most prominent of the factors are the reduction of rejections, lower cost of subsequent operations, and



Temperature Record from Electric Resistance Furnace Operating at 1700 Deg. Fahr., Photographed from Tape, Showing Drop When Current Is Shut Off

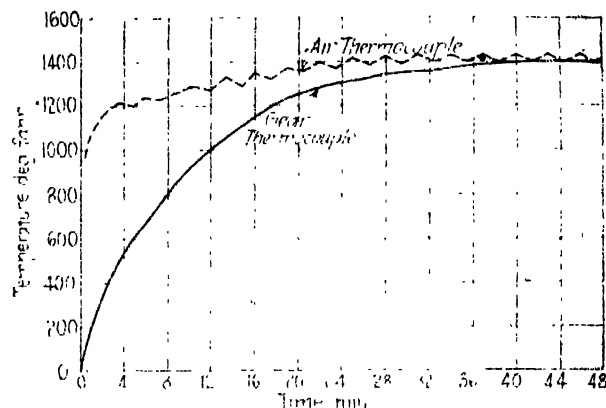
longer life of the dies. Unfortunately, accurate data are not available on these factors, but in the opinion of the foreman in charge of the work they amount to several per cent, the reduction in rejections alone being over 1 per cent, or more than the total cost of electricity.

Items 7 to 12 inclusive are at present treated in an oil furnace, the cost of the electricity having been calculated on the basis of experience with electric furnaces handling similar work. Electric furnaces are contemplated for these parts, as a cost analysis indicates that the increased cost of electricity will be more than offset by the improvement in quality.

A furnace with a rotating annular ring hearth, shown in one illustration, is used for heating gears, item 13 of the table. The cost of electricity for heating these gears is based on 30 days' operation, 9510 gears, weighing 39,107 lb., being heated in that time. The cost of oil used in heating this same gear is approximately $\frac{1}{2}$ ¢, or about one-fifth the cost for electricity. This increased cost of electricity is offset by the reduction of rejections and lower cost of subsequent operations.

While the number of gears rejected due to warping has been greatly reduced, definite figures are not available; but it has been possible to treat the gears in an

cept where a muffle is used, the heat source or flame is several hundred degrees hotter than the work; consequently, there is always the danger of overheating portions of the charge, especially parts having thin



Heating of Ring Gear in Rotary Hearth Electric Furnace

sections. This overheating results in distortion and excessive scaling.

Automatic control of temperature insures constant conditions in the furnace, and makes possible the duplication of results from day to day. A typical tempera-

Test Data of Heat Uniformity of Electric Furnace

Time	Thermocouple Temperatures, Deg. Cent.				Maximum Deviation from Average, Per Cent		Rate of Change, Deg. Per Hr.	
	1	2	3	4	Average			
11:30	25	25	25	25	25	0	0	
1:30	517	531	532	539	531	2.07	1.31	127
7:30	670	679	671	666	669	1.3	0.45	34
11:30	727	783	746	766	780	4.0	1.3	27
3:30	858	861	857	849	864	0.16	1.3	21
7:30	860	865	862	867	865	0.35	0.23	0
11:30	928	934	930	930	930	0.45	0.21	17
3:30	933	942	927	927	932	0.64	0.43	0
1:30	950	950	952	952	952	0.33	0.21	23

ture control chart is shown, which indicates a maximum temperature variation of about 5 deg. Fahr., plus or minus, in the air of the furnace. This is the variation of the air temperature, and since the air changes temperature much more rapidly than the charge, it will be apparent how accurately the temperature of the charge is maintained.

Another chart shows the time-temperature curve of gears treated in a rotary furnace similar to that illus-



Rotary Annular Electric Furnaces Designed for Maintaining a Temperature of 1650 Deg. Fahr. The hearth is 16 in. wide, the door opening 12 x 16 in., the furnace diameter 79 in. Three-phase current at 250 volts a.c. used, the power requirements being 60 kw.

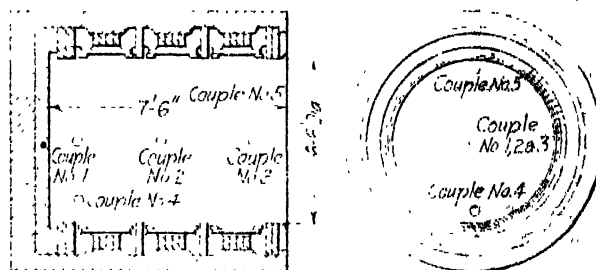
electric furnace, so as to have an eccentricity of approximately half the limits set for oil furnace practice, and limits which it is found difficult to meet with oil-treated gears. The cost of subsequent operations was reduced approximately 5¢ per gear, or an amount nearly twice the total cost of electricity for heating.

Thus the higher cost of the improved heat source, in every case cited, has been justified on the basis of the quality of the finished product. It is reflected in the reduction of rejections, lower cost of subsequent operations, and longer life of the product, any one of which will, in most cases, many times offset the increased cost of the improved heat source.

Features of the electrically heated furnace of the metallic resistor type, which make possible this improvement in quality, are:

- (1) Low temperature of heat source.
- (2) Accurate and reliable automatic temperature control.
- (3) Uniform and unvarying temperature distribution.
- (4) Absence of severe oxidizing and corroding action, common to some fuel-fired furnaces.

The large area of the heat source permits it to operate at a temperature only slightly higher than that of the parts being heated, and renders overheating of any part impossible. In the fuel-fired furnace, ex-



Locations of the Five Thermocouples Whose Indications Are Recorded in Table

trated. Sensitive thermocouples were attached to a test gear, which was placed in the furnace among the others in regular production. The "gear" thermocouple was embedded in the body of the gear itself, and the "air" couple was located a few inches above the gear. The curve is copied direct from the chart made by recording instruments. It will be observed how accurately the temperature of the gear is held at 1400 deg. Fahr. up to the time it reaches the discharge door—also that fairly wide changes of air temperature, caused by throwing the power on and off, caused no appreciable change in the temperature of the gear.

This curve also illustrates another point, the uniform

temperature that it is possible to obtain in a furnace of the metallic resistor type. In this furnace the windings are all on one circuit, and yet it is possible to maintain, by a proper distribution of the windings, a uniform temperature up to a point directly in front of the discharge door.

This feature of the metallic resistor type of electric furnace is also shown clearly in the second table. The heating of the charge under these conditions insures uniform heating, reduces distortion and internal stresses to a minimum and improves the quality of the heat-treated part. In the electric furnace ideal atmospheric conditions exist that result in the heat-treated parts being practically free from pitting and scaling. This reduces the cost of the subsequent operations in cleaning the finished pieces.

MAKES COMPARISON

Chart Shows Averages of Production of Various Products and of Unfilled Tonnage

WASHINGTON, Feb. 14.—The American Railway Association in its bulletin on revenue freight loaded for the week ended Jan. 21 presents a chart showing the monthly averages by year from 1912 through 1919 and the monthly total through 1920 and 1921 of production of steel ingots, production of pig iron and the United States Steel Corporation unfilled orders, production of bituminous coal and stocks of bituminous coal and shows the relation between the movements. The production of pig iron and of pig iron it is pointed out is usually accepted as a barometer of business activity throughout the country.

It is observed that in the years 1914 to 1919 inclusive, the trend of the two items of production followed in a fairly close way the unfilled orders of the Steel Corporation and was followed in turn by the production of bituminous coal. The bituminous production also quite generally followed the trend of production of ingots and pig iron in the first half of 1920 but the tremendous increase in bituminous production in the last half of 1920 did not follow any like trend of steel and iron production but on the contrary was in the face of a declining tendency in that production and in the unfilled orders of the Steel Corporation. This it is stated may be mentioned as contributing to the heavy stocks of bituminous coal on hand in January 1921.

Again, following April 1921 and through October there was a general tendency to increase in the production of bituminous coal but however marked by any contemporaneous increase of consequence in the production of pig iron and pig iron and with the orders of the Steel Corporation fell decline. Quite naturally, therefore, it is pointed out the (then) latest figure of bituminous stocks that for November 1921 showed an increase that carried the total even beyond that of the previous Jan. 1. A survey prepared by the Department of Commerce shows that the total commercial stock of bituminous coal on Jan. 1, 1922, was estimated at 47,000,000 tons as against 48,000,000 tons on Nov. 1, 1921.

Work Stopped at Armor Plate Plant

CHARLESTON, W. Va., Feb. 1.—An echo of the disarmament conference is heard in an order received recently by Capt. I. J. Hellweg, commandant from Secretary of the Navy Denby, to close the naval ordnance plant here and put employees on leave without pay. The order affects not only men engaged in the operation of the plant but those doing construction work on the gun plant. Captain Hellweg was instructed to retain only enough men for the maintenance and protection of the plant. The plant was engaged in manufacturing material, some of which would have been used on ships which are to be scrapped under the holiday program.

This plant, located at South Charleston, and work on which began April 6, 1917, consists of a steel works

While these are by no means all the varieties of electric furnaces, and do not include all the processes to which such furnaces lend themselves, they are sufficiently representative to give a good idea of what can be accomplished by the electric furnace in this field.

The problem of choice of steel treating furnaces is chiefly the problem of determining the effect of the various furnaces on the overall cost of the heat-treated part. A careful analysis along the lines outlined may in many cases reveal that furnace operating costs are of secondary importance. After three years' experience in the use of electric furnaces for steel treating, it is predicted that, in the majority of cases where a high-grade product is required, the lowest overall costs will be obtained through the use of electric furnaces.

and three finishing units, a projectile plant, an armor plant and a gun plant. The projectile plant was completed and put in operation in June, 1919. The armor plant is 90 per cent finished, and the gun plant 70 per cent. In recent months about 2000 tons of ordnance steel were turned out daily. About 2200 men were employed including nearly 1000 on construction work. The estimated monthly payroll was \$500,000.

Testing Materials Meeting

Greater prominence to technical papers is planned to mark the annual meeting of the American Society for Testing Materials to be held at Chalfonte Haddon Hall, Atlantic City, N. J., in the week of June 26. Among the topics which are expected to be given prominence are the following: Effect of Sulphur in Rivet Steel; Physical Properties and Tests of Steel Castings; Impact Testing of Materials; Influence of Material on Specimen for Coal; Thermometry.

The committee on corrosion of iron and steel, an ongoing semi-regularization of H. Gibbons, vice chairman of the committee, acting chairman in place of S. S. Voorhees, died and Dr. C. K. Burges, chairman of the subcommittee on preservative metallic coatings, has resigned, and H. S. Rawdon now represents the metallurgical division of the Bureau of Standards and has been appointed chairman pro tem of the subcommittee.

In Memory of Henry H. Stambaugh

In memory of Henry H. Stambaugh one of the founders of the Bruce Hill Steel Co., Youngstown, Ohio, a large bronze tablet in bas relief has been installed in the McKinley Memorial Building at Niles, which houses an imposing collection of tablet and busts of industrial and financial leaders, as well as statesmen. Unlike other tablets which represent a likeness of the man they honor, the Stambaugh memorial shows a woman's figure, in classic robes, invoking a blessing upon a man kneeling before it typifying Labor. The figure of a dog in the foreground depicts Mr. Stambaugh's love of nature. The replicas were largely gathered through the instrumentality of Joseph G. Butler, Jr., of Youngstown, who conceived the idea of the Memorial and carried it to fruition.

The Argonne Steel Ltd., has been incorporated with a capital stock of \$15,000,000 to acquire and take over the plan and business of the Carbon & Alloy Steel Co., Ltd., at Niagara Falls, Ont., and to enter into the manufacture of iron steel, metals, alloys, etc. Among the provisional directors of the new concern are Francis W. Griffiths, Arthur L. Reid, John L. Vanstone of Niagara Falls, Ont.

The Lima, Ohio, plant of the Ohio Steel Foundry Co., reopened on Jan. 16, giving employment to about 500 workers. The company has booked orders for castings for railroad equipment for the Argentine Republic and it is expected that the foundry will be kept running full time for some months.

Using Molding Machine in Job Foundry

Marked Gain in Efficiency in Making Cylinder and Piston Molds—Speed and Economy Both Served

BY PAUL R. RAMP*

(Concluded from page 399, Feb. 9)

FIGURE 6 is the drag half of a steam cylinder pattern, located on the pattern board. The dowel pins can be seen at BBB. The "center" pin is located off center, to avoid the danger of placing patterns wrongly on the board. Figure 7 is the cope half of the same pattern, located on the same pattern board, with dowel pins at BBB. This pattern was used for many years to produce cylinder castings by hand, at the rate of six to eight per day.

The only work connected with making an emergency molding machine job out of it was putting dowel pin plates in the cope and drag halves, and giving them a coat of shellac. On the machine, 60 castings were

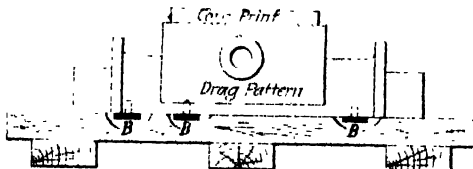


Fig. 6. Drag Half of Steam Cylinder Pattern on Pattern Board

produced daily by one finisher and two helpers, one of the helpers acting as machine operator. The quality of the castings produced by the machine was in every way superior to those made by hand, by skilled workmen.

In such cases, the advantage of the pattern board and the loose patterns can be appreciated. As the pattern board is bolted to the machine, it requires no more attention than brushing or blowing off after each mold is rammed. All patterns being loose, they must be placed on the board every time a new mold is made, hence the shape of the pattern does not matter. It requires only a moment to pick it up and drop it over the dowel pins on the board, and proceed.

This plan enabled us to make a decided saving in the cost of molding, when it was thought impossible to

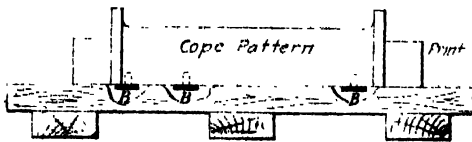


Fig. 7. Cope Half of Same Pattern on Same Pattern Board

do so, on account of the small number of parts to be made, and the very poor condition of the patterns. I believe that there are many foundries to-day that could adopt this plan, and secure very gratifying results.

The plan here described develops many unusual stunts in molding and core making. The fact that a standard size flask must be used, thus limiting the size of the pattern to be molded, makes it necessary for the foundryman to devise ways and means for molding pieces in these flasks, that in the past were molded in much larger flasks.

An illustration of this development is shown in Figure 8, which is a cross section of a mold for three

10-in. pistons. Owing to the size of the standard flask, only one 10-in. and one 8-in. piston could be molded together in the regular way. As it was desired to confine the production to one size of casting for each mold, the plan illustrated worked out very satisfactorily. The standard flask, while not having great enough length, did have an excess of depth, which was utilized by molding the pistons on edge, three in a flask, as shown in the sketch, at a 66 2/3 per cent increase in production per man. The quality of the new castings was superior to those made in the old way.

Figure 8 shows the method used to gate these molds with a gate core. This core was placed on the pattern, and rammed up in the flask, when the drag was being made. The gate proved very efficient, and produced

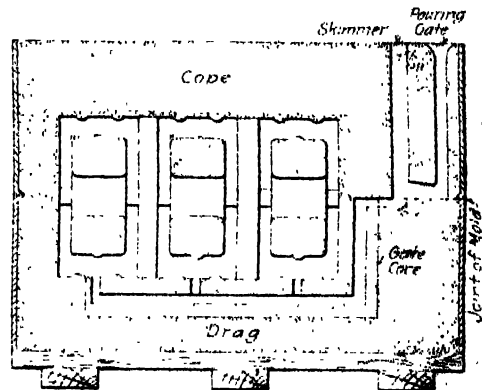


Fig. 8. Cross-Section of Mold for Three 10-In. Pistons

castings free from sand and slag holes. The idea was to arrange this gate so the metal would enter the molds directly under the main cores, and thus act as a safeguard, by providing that, in case any objectionable matter should enter the mold with the metal, it would be carried up to the core, and would lodge where it would do no harm.

There was a question as to whether or not the upper edge of the piston, that represented the highest point of the mold in the cope, would shrink. To help reduce this danger, the grooves for the piston rings were par-

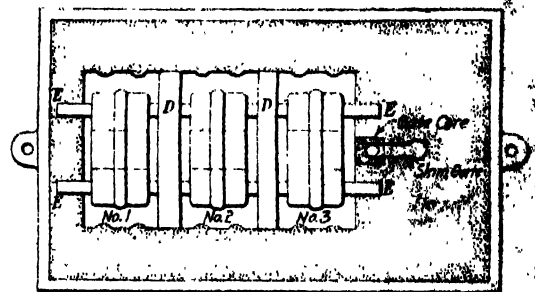


Fig. 9. Drag Mold for Three Pistons with Core in Place

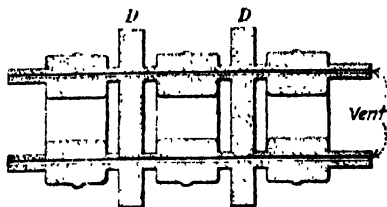
tially formed in the rough castings; but it was found later that this precaution was not necessary, as all of the castings came out solid at this point. Figure 9 is

*Battle Creek, Mich.

another view of the 10-in. piston mold, with the main core in place. This sketch shows also the locations of the gate core and of the skim gate.

One complete core is all that was required to produce three castings. The slab parts of the core, marked DD, represent the division between pistons No. 1 and No. 2, and the division between No. 2 and No. 3. As the slabs also act as supports for the main cores, they make chaplets unnecessary. Only two holes on either

Fig. 10. Section of the Gang Core Used in Making Three Pistons in One Mold



side of these pistons were formed, in providing the vent passages, instead of the three, necessary when the pistons are molded with the flat surface up. These holes must be drilled, tapped and plugged. The gas escaped from the core through the passages marked EEEE.

This job worked very smoothly on the jolt roll-over molding machine, in the standard flasks, and no delay was experienced in changing from other jobs to this one.

Figure 10 is a cross section of the gang core used to make the three pistons. This core was made in halves and pasted together. The time required was not more than one-fifth greater than that required to produce a core for a single piston. In this case, as in many others, the very fact that something radically

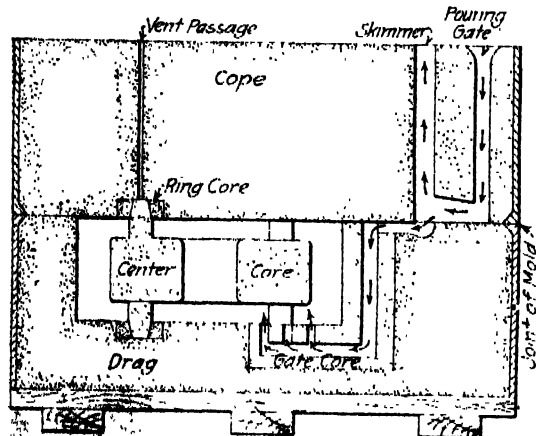


Fig. 11. Cross Section of 12-In. Piston Mold on Standard Pattern Board

different had to be done, to enable the foundryman to use his equipment, developed a decided saving.

Figure 11 is a cross section of a 12-in. piston mold, made on the standard pattern board with a jolt roll-over machine. In this case the piston was molded in the usual manner, instead of being molded on edge. The main objection to making this casting on the machine was the fact that, in order to carry off the vents from the main core, it had been the practice to place the main core in the mold and place the cope on the drag, thus securing on the cope an impression that could be used as a guide, to locate the vent passages through the cope after it was lifted off again.

This plan made it necessary to try on every cope, and interfered very materially with progress in molding machine work. To overcome this objection, the part of the core that normally came flush with the point, and was touched when the cope was tried on, was made longer, so it would extend into the cope. Three extra pin holes were properly located in the standard pattern board, to take care of the core prints when the

cores were rammed. These three prints were located directly in line with the corresponding core prints on the drag side of the pattern.

When either the cope or the drag was rammed, a small ring core was dropped over the core prints, to insure against crushes, etc. Figure 11 shows the ring core in place in both the cope and the drag. The special gate core mentioned before was also used, as shown in the sketch, being placed on the pattern and rammed up with the mold, the same as the ring cores. When the drag was made, the pattern, being provided with the three standard dowel pin hole plates, was very nicely located on the board in its proper place. When the cope was rammed, the three small prints were located on the pattern board by the three special dowel pin holes. This arrangement insured a perfect match, so far as the cope and drag core prints were concerned.

The next important question was to locate the print part of both sides of the core, so they would match the prints in the mold. Figure 12 gives two views of this

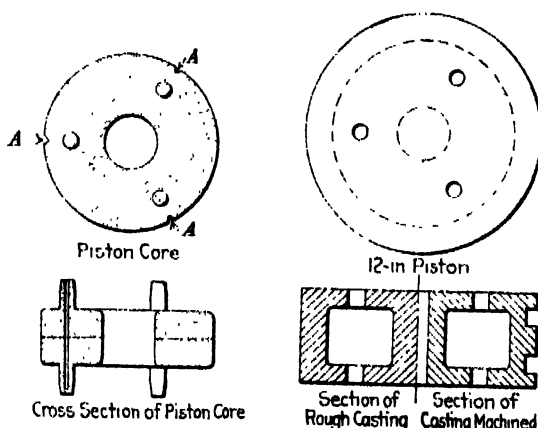


Fig. 12. Notch Method of Making Two Halves of Core Register in Mold

Fig. 13. Piston Casting, Left Half Rough, Right Half Machined

core, which was made in halves and joined at the center. The plan used to make the prints register correctly is shown here. The three notches marked AAA, opposite each print part of the core, were provided in each half of the box, and acted as the guide when the cores were pasted. With the core made in this manner, and the old pattern provided with three extra core prints for the cope, the old piston pattern was converted into a molding machine job. It was not necessary to try the cope on the drag in order to find the proper place to produce the vent passage; the prints in the cope did this. This job was run at the rate of 10 to 20 per day, with other work, very successfully both as to quality and quantity.

Figure 13 is a cross section of the casting described here, showing one-half rough and the other machined. These two piston jobs are instances where something a little out of the regular plan had to be done to machine mold with the old patterns. But even the cost of the extra core prints for the cope, the three notches in the core box and the three small pin holes in the board, would not in any way compare with the cost of rigging this job up in the best manner for the best production on a machine.

This kind of molding machine practice is not recommended except in such cases as mentioned above; but I know that there are numerous places where this plan can be worked very successfully, though the operators may now consider it impossible.

The Erie railroad has awarded a contract to the Youngstown Equipment Co. for operation of the car shops at Brier Hill in Youngstown, Ohio, and the locomotive roundhouses at Brier Hill and Kent. This company, formed by Youngstown capital, recently took over operation of the Erie car shops at Kent, Ohio.

Leaves from a Steel Melter's Note Book—III

Experiences in Casting Steel Ingots in Cans—How Cracks Were Prevented—Causes of Hard Spots in Forging Ingots

BY HENRY D. HIBBARD

AT the first steel works at which I was employed, in New England, steel ingots for forging purposes larger than 12 x 12 in. square were generally cast in cans made of wrought iron sheets. This included all the tire ingots or "cheeses," as they were called, for tires for locomotive drivers which were short cylinders, as well as cylindrical ingots varying from 16 to 28 in. or even more in diameter, and weighing from 2000 to 28,000 lb. each. We had a 10-ton hammer, as large as any in the country in those days. It had a 10-ton tup and was double-acting that is, steam was admitted on top of the piston to increase the downward velocity of the ram and so the power of the hammer. The anvil weighed but 90 tons, which was far too light for such a hammer. The die block was broken and patched. This hammer was employed in breaking down tire ingots as well as in making all the largest forgings, but we had smaller hammers for the lighter ones. The largest forgings made were of 10 tons weight finished, which called for the largest size of ingots that we could make, taking a whole extra large heat of 28,000 lb. from our 10-ton open-hearth furnace.

Preparing the "Cheese" Containers

For each cheese a can was made of a single sheet of iron of No. 22 gage rolled into a cylinder with the joint riveted with five or six rivets about 3/16 in. in diameter. The edges at both ends were bent inward so as to give a rounded edge to the cheese of about 1/2 in. radius. The bent edges also helped to preserve the true cylindrical shape of the can in handling and setting for casting. These tire ingots were bottom cast in groups of four on one bottom plate provided with a central runner from which the steel was distributed to the molds through runner bricks in the usual manner. A can was placed over each runner opening and around it was set a cylinder of boiler iron 1/2 in. thick, about 4 in. larger in diameter and 3 or 4 in. taller than the can. The space between the can and surrounding cylinder was filled with dry sand level with the top of the can. On each can was placed a heavy cast iron disc having a rising conical central hub containing a riser cavity about 10 in. high, which served also as an air vent. These discs were clamped down to resist the upward pressure of the steel against them.

We knew little of pipes and nothing at all of segregation at that time but the method of subsequent manufacture practiced—the punching out of a cake of metal from the center—removed some of the unsound central metal around the pipe which each ingot must have had, and the remainder, lying in use against the wheel center where it was not subjected to wear, did no particular harm. The best metal was on the outside where it was wanted to take the wear on the tread of the wheel. The riser cast on had a thickness of 2 in. tapering to 1 in. which was not large enough to feed the solidifying ingot as it settled. It was broken off by a blow with a sledge and thrown into the scrap for remelting.

Flexibility in Ingot Weights

The great advantage of this method was that ingots of any weight could be made as desired, which was important because one ingot made one tire. They weighed from 900 to 1200 lb. each. The size of the can was made to suit, while everything else about the casting apparatus was unchanged. In those days iron was cheaper than steel, so the can in being wasted in heating and forging replaced so much steel without adding to the cost. The fusion point of the iron can being higher than that of steel, the can would remain solid when being filled with molten steel which welded

to it nearly all over. At that time, at one other plant located in the West, cast iron cylindrical molds were used for casting single tire ingots. Several sizes of different diameters were kept on hand with top plates to suit. The exact weights were obtained by adjusting the height of the cast iron top plate, which was of a size to fit loosely inside the mold.

For general forging purposes long cylindrical ingots were made, the cans in which they were cast being made of sheet iron of No. 16 gage. Such ingots under 18 in. in diameter had no visible structural defects and were smooth and satisfactory, though of course it is now clear that they had concealed pipes. In the larger sizes, with diameters of from 24 to 28 in. and lengths of from 10 to 12 ft., the cans wrinkled longitudinally but irregularly in casting and the ingots were likely to develop cracks under and along some of the wrinkles in the forging operation. The wrinkles were formed by the expansion of the can itself when heated by the molten steel, as it could not enlarge, its circumference being firmly imbedded in the incompressible sand and therefore forced to buckle, so that the wrinkles resulted. Why a crack should develop under and along a wrinkle was not understood, but the fact of their presence was indisputable.

Preventing Wrinkles and Cracks

The can-maker was an ingenious man and he one day conceived the idea of making a can with a longitudinal slip joint to take up the expansion of the can and so prevent the formation of wrinkles. The first ingot cast in such a can had fewer and shallower wrinkles than any previously made and showed that the cure had been found, as in ingots without wrinkles there were no cracks. A number of kinds of slip joints were tried and one finally adopted as standard. In that joint the usual rivets of the longitudinal joint were replaced by short stove bolts which could be tightened as much as was desired to hold the parts by friction and yet allow them to slip past one another when expansion took place. These bolts were spaced about 3 in. apart. In one edge of the joint horizontal slotted holes were cut in the sheet, which allowed a motion of 1 1/2 in. The other edge was punched to receive the stove bolts, registering of course with the slots. Then on this other edge from end to end of the can a cover strip or plate of the same sheet iron was riveted on to keep the sand out of the opening between the edges 1 1/2 in. wide as well as the slots, the slotted edge lying between the two. This cover strip was hammered into a shallow Z cross-section to allow space between it and the can for the slotted edge to slide. That strip was about 5 in. wide and was of course punched for the stove bolts to pass through. All this was expensive but nevertheless it paid because of the time it saved at the hammer where in former practice each crack had to be cut out after having been isolated on a raised lump by hammering down the metal around it. Some smaller cracks were only removed by rough-turning the forging. The cans were later fitted with an expansion joint at the top end made on the same principle to take up the longitudinal or vertical expansion of the can. Ingots so cast were beautifully smooth and gave full satisfaction in the forge as far as cracks were concerned.

Method for Forging Ingots

As in the case of the tire ingots a forging can was placed within a strong cylinder and the space between the two was filled with dry sand. For the larger sizes old boiler shells which came in the scrap were used for outer casings. For smaller sizes we had a lot of heavy

wrought iron rings which had been reinforcing rings around the breeches of Parrott rifled guns in the Civil War. Small forging ingots were bottom cast and large ones, weighing 10 tons or more, were partly filled from the bottom and the remainder from the top. If wholly top-poured the can would be in danger of being cut or washed away, somewhere, as the force of the stream of steel falling 20 ft. in extreme cases was very great. In fact, we lost one 12-ton ingot in that way, the can being cut through and the sand mixing with the steel. The method of first bottom-pouring and then top-pouring in sequence is still followed in teeming large ingots.

To handle the ingots we had a jib hydraulic crane rated at 15 tons capacity, but the accumulator did not give enough pressure to lift a 28,000-lb. ingot. To lift such a weight the accumulator was shut off and the pump made to discharge directly into the crane line, which gave the pressure required. Hauling such an ingot to the forge shop was quite a feat, requiring a team of eight heavy draft horses. On the snow in the winter time a heavy sled, built for the purpose, was used, but when the ground was bare of snow the ingot was carried on a heavy truck. No railroad track could be used, though there were tracks in the yard.

The great advantage of this method of casting in cans lies in its adaptability for making any weight or shape of ingot desired by the use of a can of the proper size. Otherwise an assortment of large cast iron molds would have been needed.

Little Knowledge of Pipe Prevention

Many large forgings for those days were made from ingots cast as described. Though they were readily made, they were not always satisfactory in use because of inadequate knowledge, at that plant at least, of piping and means for dealing with it, segregation, annealing and heat treatment and particularly because of faulty design on the part of the customers. A riser was cast on the upper end of each of the larger ingots to afford means of clamping on the porter bar and handles for manipulating the ingot during forging, giving the ingot the shape of a bottle. This riser was much too small to feed properly the settling steel and every one of the ingots must have had a large pipe cavity and unsound region at the top under the riser. I remember one short ingot about 3 ft. in diameter for a gun jacket for the Government. The machinist who bored it (there were no hollow forgings in those days) told me that a lot of the steel had fallen out in pieces from the center, which in my ignorance of pipe and gas holes I found hard to believe. I was chemist of the works at the time and naturally thought that I knew much more than I did. He spoke truly, however, for the ingot must have had a large pipe with surrounding unsound metal which in forging must have been broken up. The silicon was not high enough to cause a perfect pipe to be formed.

Our forging steel was usually of a grade which would stand, neither rising nor settling much. When we put in as much as 0.15 per cent of silicon, as we did for some special work, we called the product silicon steel. We never did anything to obliterate or lessen pipe. However, at that time we made most of the large steel forgings for this country and perhaps knew as much about making them as any plant this side of the ocean, though in Europe, I believe, from what I have since learned, they knew much more than we did.

Still, one might say the whole art of making good large forgings has been learned since then. Pieces in stock out off the bottoms of large forgings made from ingots which were too large for the purpose were perfectly clean and sound, with no seams or other defects, and excited the admiration and curiosity of a visiting friend employed in one of the great plants of the country where "tonnage" steel was made. To his inquiry as to how we did it, I could only mention the great pressure under which it was cast due to the head of metal above it, casually adding that of course the steel was properly made.

Cracks in Ingots Cast in Iron Molds

When large cylindrical ingots were made in cast iron molds they were very liable to be cracked lengthwise,

particularly near the bottom. This was due to the ferrostatic pressure which forced the first skin of steel to freeze as solidification began, out against the heating and consequently expanding mold. The frozen skin, of course, was cooling and contracting at the same time. Now, freezing steel passes through a mushy stage at which it has but slight coherence, and at that stage the freezing skin was liable to be torn apart in places, the tears forming cracks. Clean, well-made steels will crack less than impure, dirty, underdone steels but any steel is liable to be cracked when cast in a large cylindrical cast iron mold. A cylinder does not admit of increase of volume without stretching its circumference. Because of this tendency to crack, other cross-sections of ingots were adopted in after years varying from polygons to coarsely corrugated contours. The polygons now usually made have slightly concaved sides and rounded corners. Any of these newer shapes allowed the frozen skin of the still fluid ingot to follow and adapt itself to the mold without being torn apart or cracked. Ingots cast in cans are not liable to have cracks due to pressure, as the mold does not expand but tends rather to contract, due to the expansion of the sand as it is heated.

There is another great advantage beyond that of preventing cracks, from having an ingot polygonal, six or eight-sided. A cylindrical ingot, unless hammered or forged with grooved dies, which prevent undue lateral spreading of the metal, is likely to be torn apart within, along or near the central axis, which defect is sometimes called a pipe, though it is of quite different origin from the pipe caused in casting by the settling of the freezing metal. The two kinds of pipe, when greatly drawn out by forging or rolling, may be much alike and justify the designation by the same name. The central tearing may be done to a perfectly sound ingot. The danger of it is greatly lessened if the ingot is polygonal, as the flat surfaces enable the metal to be worked more uniformly and to the center. A round ingot should be forged first into a polygonal shape, four, six or eight-sided for this reason, but it is advantageous to start with the ingot polygonal.

Hard Spots in Forgings

Another trouble that we had with our large forgings was that occasionally in turning them in the lathe hard spots in the metal were encountered which sometimes would break or crush the cutting edge of the turning tool. The machinist would stop his machine and cut them out with a cold or cape chisel, losing, of course, considerable time. The cause and cure of these hard spots we never learned, at least while I was there. Sometimes there were a few in a scattered group and in other cases dozens in a larger group, extending perhaps 2 or 3 ft. along the forging. They occurred in steel which had been thoroughly melted and in which no pieces of unmelted charge could have remained. Others who have found hard spots to be higher in carbon and manganese than the remainder of the metal have ascribed them to unmelted spiegel, which of course is extremely hard, but ours were certainly not due to that cause. One thing I noticed was that in forgings which had been worked by the hammer less than usual, say to one-half of the diameter or one-quarter of the area of cross-section, many of the hard spots adjoined and formed a part of the wall of gas holes not wholly closed by the hot-working given the piece. This indicated that they were formed by a sort of local segregation, as were the gas holes. Since then further knowledge of the structure of ingot steel leads one to suppose that there may be local segregation between the pine tree crystals or dendrites which form in slowly freezing steel. In those days we knew little about casting temperature, simply aiming to have the steel hot enough to cast cleanly into the molds. The steel-making methods used (pig and scrap bath with hot blooms added) automatically regulated the degree of heat, so that no precautions were taken to prevent the charge temperature rising too high. Since working by other methods where the charge temperature required to be carefully controlled, I have imagined that those hard spots were perhaps in steel cast too hot, which in a can surrounded by sand cooled so slowly that there was

excessive segregation of nonferrous elements between the crystals. This explanation does not account, however, for the occurrence of hard spots in groups, and not over the whole ingot, or even over the whole horizon or level when they did occur.

As a cast iron ingot mold usually weighs as much as the ingot it will hold or more, a steel plant making large forging ingots has necessarily a large investment in its assortments of molds, which require great space for their storage. Casting in cans obviates most of the expenditure and space required.

In recent years the method has been reinvented, sheet iron being used in forming the risers on large ingots, some of them many times greater than the largest we made at the old New England plant. When the mold for the riser or hot top of such an ingot is

formed of loam, sand or other refractory, the sudden heating by the inflowing steel will cause its inner surface material to expand, which may make it crack and spall off in places, the loose pieces falling into the liquid steel below. This the sheet iron casing prevents.

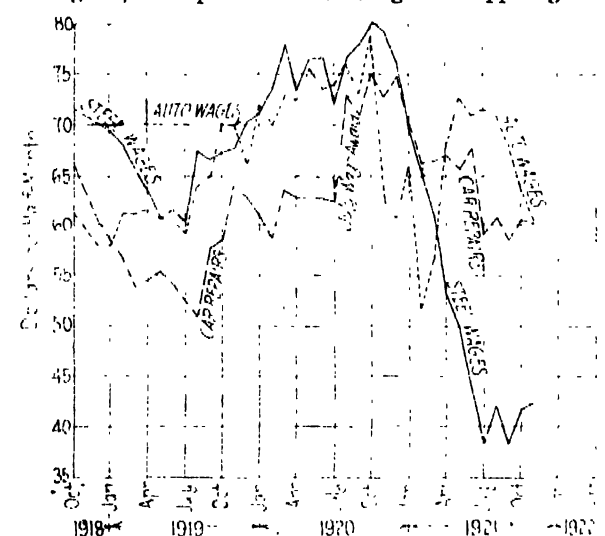
The method of casting ingots in cans was patented by W. Dougherty, of Philadelphia, in 1873 (Patent No. 139778), the single claim of his patent reading: "The method of casting steel in wrought iron or other metallic cases when the latter is of such thickness as to admit of the heat of the melted steel completely welding the case to it, substantially as and for the purpose above set forth."

The patent was not well drawn and did not cover the case very well, as the welding of the can to the ingot was never complete

1918 to 1922 Course of Metal Workers' Wages

Pay Envelopes of Iron and Steel Workers, Car Repair Shops and Automobile Plant Operatives

DURING the past three years there have been numerous changes in rates of wages of men employed in metal-working plants. Figures of the United States Bureau of Labor Statistics show that in October, 1918, the average semi-monthly wage in iron and steel plants averaged \$71.67 per man. This figure dropped grad-



Course of Wages in Steel Mills, Automobile Factories and Car Building and Repairing Shops

ually until in July, 1919, it was \$60.35. After this a more or less steady increase brought the figure for October, 1920, to \$80.24. Since that date the decline has been well sustained, reaching low points in July and September, 1921, with a slight recovery to \$42.56 in November.

The course of these changes in average wage, month by month, is shown on the chart.

Similar figures for men engaged in the building and repairing of railroad cars show a trend quite different from that of iron and steel workers. This is due to the fact that many of these men, being employed directly by the railroads, have come within the wage scales and other regulations put forward by the Government, and hence have not felt to the same extent either the law of supply and demand or the contraction of business of the past year.

In October, 1918, these men were receiving an average of \$66.56 per half month, which figure dropped gradually until in August, 1919, it was \$51.05. After that there was a well sustained rise so that, during the early months of 1920, the figure was between \$62 and \$63. There was a sudden rise from the \$62.43 of July to \$72.85 in August, due, of course, to the heavy wage increase allowed by the Railroad Labor Board at that time. The figure held between \$70 and \$75 per half

month through January, 1921, after which date it has fallen, due partly to the cutting out of some of the so-called national agreements, until in November it stood at \$60.26. This figure is 42 per cent higher than the pay of the iron and steel workers.

Changes in the pay of automobile workers have followed to some extent the corresponding figures for iron and steel men, reaching a maximum in the same month and responding more closely to the law of supply and demand than in the case of the car builders. Automobile workers are paid by the week, but the figures, translated into semi-monthly totals by multiplying by 2 1/6, are as follows:

In October, 1918, the amount was \$61.45, which is substantially lower than either the iron and steel worker or the car builder was receiving. With minor fluctuations this figure was maintained until the summer of 1919, being \$63.85 during August. A higher range of pay then set in, fluctuating with conditions, but being consistently more than \$65 per half month, until finally it reached \$79.51 in October, 1920. With the collapse of the automobile market at that time, wages fell heavily, going as low as \$51.78 in February, 1921. They have since gone up again, reaching \$72.62 in May, but have again fallen to \$60.45 in November. This is also 42 per cent higher than the steel worker's November wage.

In all the foregoing it is to be remembered that the unit figures are the quotients of total payrolls divided by the number of men employed. They, therefore, take into account overtime employment in some periods and short time employment in others, being thus not direct indications of wage rates at different times.

The proceedings of a conference of the National Association of Office Managers held in October has been printed for distribution at \$1 per copy. Among other things the booklet describes at length the methods of increasing office production through standardization, and there is a detailed analysis of the office manager's job. A copy of the pamphlet, which has 56 pages, may be obtained by applying to the secretary of the association, F. L. Rowland, Gilbert & Barker Mfg. Co., Springfield, Mass.

Business is picking up in Bridgeport Conn. The Challenge Cutlery Co. is to double its working force, the Union Metallic Cartridge Co. is to go on a five day per week schedule, the Bridgeport Metal Goods Co. on a five and one-half days schedule, and other industries other than the machine tool report better business. The Bridgeport Metal Goods Co. received more business in January than it did during the first six months of 1921.

Welding Rods for Oxy-Acetylene Welding*

Their Selection and Composition as a Factor in Successful Results on Steel—Welding Cast Iron—Copper and Brass Welding

BY J. R. DAWSON

UNTIL very recent years little scientific welding research has been done and, although much has of late been accomplished toward improvement in welding rods and the welding art, there remains great opportunity for advancement, especially in the direction of the design of rods best suited to various requirements.

It has been my privilege to conduct in collaboration with my associates and to closely observe a considerable number of tests in connection with certain investigations of standard commercial welding rods, as well as of experimental rods of various compositions, and this paper is based on information thus obtained.



Fig. 1—A Macrograph Shows Filled in Weld Metal, and Its Junction with the Original Steel Plate. Humphrey's cupric chloride etching reagent was used, and the weld metal was made darker by this treatment.

Great strides have been made in perfecting the apparatus used in this industry and in improving the quality of the gases and the facilities for their economical distribution. These higher quality welding materials enable the operator to obtain correct mixtures of the gases and to maintain a close control of the flame. This feature is important, because variations in the intensity of the flame or the use of incorrect gas mixtures lowers the quality of the weld.

It is only recently that the importance of the correct selection of the welding rod has received any considerable share of the recognition that it merits, and that researches have been carried out for the improvement of existing rods and the development of new rods.

Consideration in the Selection of Rods

Unfortunately, in oxy-acetylene welding the practice has too often been to fill a steel weld with whatever steel rod happened to be at hand, or to weld copper with a plain copper wire, the general character of

the metal in each instance determining the most convenient filler at hand, without reference to scientific balance of component elements. The results of such methods have frequently been disappointing.

A better procedure is to use a rod that will produce a joint as good as, or better than, the original or base metal. The metals joined are usually in the rolled or forged condition, while the metal deposited from the welding rod is in the cast condition. Very often a metal is of such composition as to possess excellent properties after forging and heat treatment but in the form of the casting is of little value.

This is well illustrated by the comparison of chrome-vanadium steel. After forging and careful heat treatment these steels have a tensile strength of about 150,000 or even 200,000 lb. per sq. in. and are highly resistant to shocks and alternating stresses. In the cast condition the tensile strength is very little better than that of unalloyed steel of the same carbon content.

The welding operation frequently causes a change in the chemical composition as the metal of the rod is fused into the weld. For example, an 11 to 13 per cent manganese steel is widely used where resistance to wear and shock is required. A welding rod of this composition will yield welded steel containing 9 per cent to 10 per cent manganese, which is so brittle as to be without value. The solution is to use a rod containing at least 14 per cent manganese, which will yield weld metal of the correct 12 per cent manganese content.

Hard to Obtain a High-Grade Weld

To obtain a high grade weld it is necessary to fuse the edges of the base metal and the welding rod at the same time and to obtain an intermingling of the two metals. The product of this mixing may be entirely different from either of the original metals. This may be illustrated by attempts that have been made to weld cast iron with steel rods. The mixture of the metals at the junction is weak, brittle, hard to machine, and lacking in the good qualities of either steel or cast iron. However, when the product is not required to stand severe strains or shocks there are certain instances when steel may be welded to cast iron.

The composition of the rod should be such that during welding the metal is not so liquid as to run easily over the unfused metal, thereby covering up improperly fused and oxidized surfaces, nor should the melted metal be so viscous as to pile up and cause difficulty in obtaining a weld that is homogeneous and smooth at the surface. A satisfactory rod will be sufficiently free from impurities and of such composition that the slag formed by welding will fuse and float readily to the surface of the molten pool. A very thin slag has the advantage of protecting the metal surfaces from oxidation, and when present in small amount is not readily entrapped in the weld.

Manipulation is easier and attended with greater success when the melting points of the rod and the metal being welded are approximately the same. Where there is considerable difference, the low-melting-point metal is overheated and damaged before the higher-melting-point metal is fused.

This rate of fusion also makes important the exercise of care in choosing the size of rod and welding head for a given weld. The heat supplied should be sufficient to keep a small pool of molten metal in the weld and to melt in additional metal from the rod. If the rod is too large it will tend to chill the molten bath and may sufficiently lower the temperature to retard or virtually stop fusion of the rod metal into the weld. On the other hand, if the rod is too small it will not

*From a paper read before the annual convention of the International Acetylene Association in October, 1921. The author is one of the technical staff of the Union Carbide and Research Laboratories, Inc., Long Island City, N. Y.

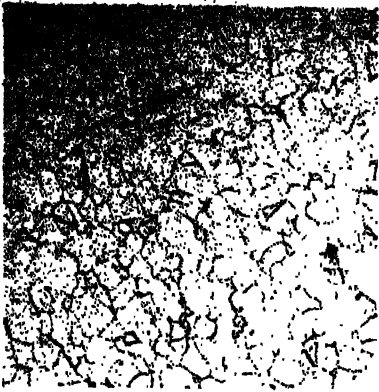


Fig. 2—This Specimen Contains Less Than 0.5 Per Cent Carbon. The field is made up of ferrite and small inclusions of oxides which are frequently found in very soft steel. (X 100)



Fig. 3—Weld Made from a Very Low Carbon Rod, Containing Large Irregular Ferrite Grains. The scattered black dots are iron oxide. This impurity is less frequently found in welds made from a slightly higher carbon rod. (X 100)

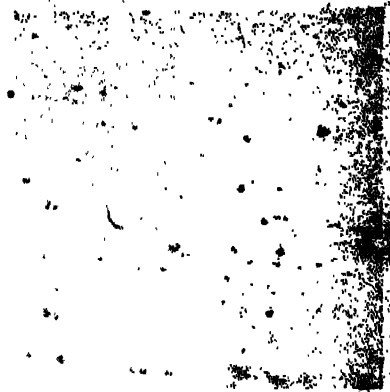


Fig. 4 (Unetched)—Shows Impurities in 0.02 Per Cent Carbon Steel Rod. Most of these inclusions are aluminum oxide. Upon welding with this rod a granular-appearing slag, formed on the surface of the melted metal, made it difficult to obtain a clean weld. (X 100)

absorb the heat of the flame and pool rapidly enough, and the excess heat which results in the weld will burn the metal.

The usual method of manipulation is to melt a small pool of the base metal and then insert the rod in the molten pool. Then the rod absorbs the heat necessary to melt it down and at the same time prevents the temperature of the molten pool from rising

clean weld, because it keeps the melting metal covered by the pool, prevents any oxidation below the surface, and makes it improbable that any oxidation or foreign matter will be carried to the interior of the weld. Furthermore, the neutral gases, when directed at the weld adjacent to the rod, envelope both the rod and the bath in such a manner as to exclude atmospheric oxygen from the weld, so that excessive oxidation cannot occur

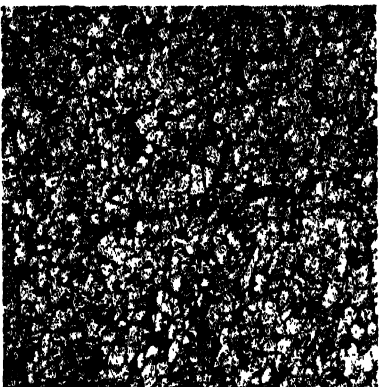


Fig. 5 (Left)—Structure of Steel Rod Containing 0.20 Per Cent Carbon. Dark areas are pearlite, the carbon carrying constituent, and light areas ferrite. (X 100)

Fig. 6 (Right)—Weld Made from 0.35 Per Cent Carbon Steel Rod. The Widmanstätten-like structure is characteristic of medium carbon steel that has cooled undisturbed from a high temperature. A weld showing this structure is frequently stronger than the low carbon weld previously shown, but its ductility is seldom as good. (X 100)



far above its melting point. The principle is the same that governs the temperature of water containing ice: It cannot be heated to a temperature higher than that of melting ice until the last of the ice is melted.

The torch is moved gradually along the weld and all slag is floated to the surface. Laps or cold shuts are melted out, the rod being kept constantly in the pool to supply metal for filling.

The covering of unfused surfaces would produce the difficulty commonly called lamination, which is similar to the seams that sometimes occur in the rolling or forging of steel. This method of holding the rod suspended in the molten pool aids in the production of a

when the filling rod and the blowpipe are manipulated properly.

Welding Rod Materials and Their Composition

The most important of the welding rods, if we judge by the quantity consumed, is Norway iron which, though really a steel, approaches closely to pure iron. A weld made properly with this rod will have a tensile strength of over 50,000 lb. per sq. in. and an elongation of from 25 to 30 per cent in 2 in., thus combining high strength and excellent ductility.

The next in importance is the mild steel rod which contains 0.20 per cent carbon and other elements in the

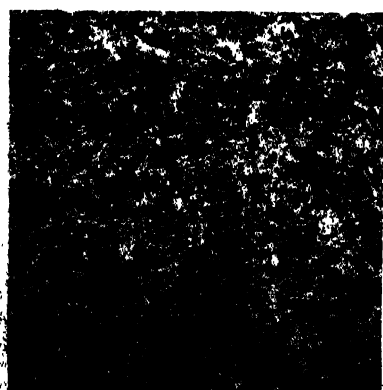


Fig. 7 (Left)—A 0.90 Per Cent Carbon Steel. This eutectoid steel contains just enough carbon so that neither free ferrite nor free cementite is formed. (X 100)

Fig. 8 (Right)—Structure of Weld Made from Rod Shown in Fig. 7. The grains are quite large and the steel in this case is largely sorbitic. This weld is relatively hard and resistant to wear, but is of lower tensile strength than lower carbon steel welds. (X 100)



THE IRON AGE



Fig. 9 (Left) - Cold Drawn Nickel Steel Rod - Carbon, 0.24 per cent, nickel, 3.50 per cent. The elongated grains are due to the deformation set up by the reduction during the drawing operation ($\times 100$)

Fig. 10 (Right) Weld Metal obtained from Nickel Steel Rod. One small slag inclusion is shown, otherwise the weld is quite clean and free from defects ($\times 100$)



usual percentage. Norway iron and this material may be used interchangeably, depending largely on the operator's preference. The mild steel rod ordinarily gives a weld of higher tensile strength, but of slightly lower ductility.

The following table illustrates the tensile properties of welds made by a properly trained operator using

Welds have been obtained that have a Brinell hardness higher than 400, which is too hard to machine. However, any hardness in the range from a very mild steel of Brinell number below 100 up to the highest value can be obtained by the selection of a rod of suitable chemical composition.

Steel which has been subjected to mechanical work,



Fig. 13 This Photograph at Two Diameters Shows a Section of Cast Iron as Welded with the Oxy-acetylene Torch. The weld is free from blowholes or slag inclusions and a perfect intermingling of the weld metal and plate metal has been obtained

the mild steel filling rod. Note the practical uniformity in the results of the successive welds:

Sample No	Yield Point, Lb. per Sq. In.	Ultimate Tensile Strength, Lb. per Sq. In.	Elongation in 2 In., Per Cent	Contraction of Area, Per Cent	Fracture
1	36,000	54,150	10.0	18.6	Fine crystals
2	34,550	55,400	14.0	20.6	Silky
3	36,420	56,700	16.0	16.0	Silky
4	35,150	55,100	12.0	14.4	Fine crystals
5	37,150	53,200	10.0	18.6	Silky
Average	35,850	54,850	12.4	17.6	

These values were obtained in testing welds in ship plate of 60,000 lb. per sq. in. tensile strength. They are merely good average welds. The specimens were machined over all to make it possible to secure accurate measurements.

High carbon welding rods are employed for building up worn shafting and for many other common uses where metal is required of sufficient hardness to resist wear and tough enough to resist shocks and other stresses. The carbon content of these rods may vary over a rather wide range, depending on the requirements of the finished welds.

as in rolling or forging, is strengthened by increasing the carbon content, but an increase of carbon in steel welding rods does not greatly increase the tensile strength of the resulting weld because the weld is essentially a casting, and the weld metal forms in larger and weaker grains as the carbon content is increased, and to the added fact that welders have greater difficulty in obtaining sound welds with the higher carbon steels.

Nickel Steel Rods

There are a few very skillful welders who have obtained excellent success with nickel steel welding rods containing 0.20 to 0.25 per cent carbon and 3.0 to 3.50 per cent nickel. Many other welders obtain poor results with this steel owing to cracks that form in a weld while it is red hot. The tendency to crack is due to the brittleness of nicked steel at high temperature. This property is illustrated by the difficulties so frequently encountered in forging nickel steel and by high temperature tensile tests.

Operators who are sufficiently skilled in handling nickel steel rods can make welds having a tensile strength as high as 60,000 lb. per sq. in. This strength is greater than that of low carbon steel plate, such as,

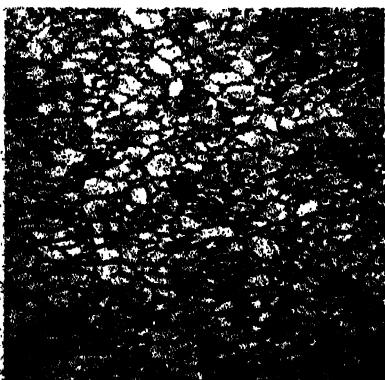


Fig. 11 (Left) - Manganese Steel Rod. Magnification 125 diameters. The small light colored grains are austenite, which is a rather unstable constituent. Relatively low temperature heating will cause it to break down into martensite, which is hard and brittle. Mechanical working as machining or filing has a somewhat similar effect, after the first cut is taken the portion adjacent to the cut becomes unmachinable ($\times 425$)

Fig. 12 (Right) - Manganese Steel Weld Metal. Here the austenite grains have partially disintegrated and martensitic structure is observed. This material is shown in the welded condition before being heat treated. Surrounding the grains can be observed thin white lines of carbide. This material is present in such small amount as to be without value for strengthening the metal, but serves as a weak binder between the grains. Correct heat treatment will change this metal to the desirable austenitic condition. ($\times 100$)





Fig. 14 (Left)--Gray Cast Iron, Unetched. Large plates of graphite tend to weaken the metal. ($\times 100$)



Fig. 15 (Right)--Gray Cast Iron Weld Metal, Unetched. Here the graphite flakes are of smaller size and the metal is even stronger than the casting because the continuity of the metal is greater. ($\times 100$)

boiler plate, and, when tensile tests are made, the break does not occur in the weld but generally several inches away in the plate metal.

High-speed steel rods are used rather widely for making tipped tools. The high-speed steel is melted into a slot, cut from the end of a low carbon steel shank. After correct heat treatment the cutting qualities of the high-speed steel deposited by the oxy-acetylene welder are as good as the high grade commercial brands of high-speed steel. The melting causes very little change in the chemical composition, usually a slight reduction of the contained silicon and manganese, so the rods used should have about the same composition as a standard high-speed steel. A wide variety of shapes and sizes of tools are thus made available without tying up an appreciable amount of money in costly material, as is the case when solid high-speed steel is used. The requisite for success here, as with every high-speed steel, is correct heat treatment.

Manganese rods are employed in the repair of machinery used for grinding and for other service where great resistance to abrasion is required. Special precautions are necessary in welding this steel. The part to be welded should be supported so that the heated portion will be under as little strain as possible; it should be preheated to redness before the welding is begun and kept red hot during the operation. In this steel the favorable properties of great resistance to shock and abrasion are brought out by quenching in water from a temperature of about 1800 deg. Fahr. To obtain the best results after welding, the quenching practice employed in manufacture should be followed closely.

Welding Cast Iron

One of the commonest of oxy-acetylene welding operations is the welding of cast iron. The expenditure of a few dollars for welding in this field may easily result in the salvage of a casting worth several hundred dollars.

The composition of the rods used for this work is that of ordinary gray cast iron, the silicon content of which should be relatively high and the percentage of sulphur low. Excepting for certain special uses, gray cast iron is standard. Increasing the silicon content reduces the amount of carbon retained in solution during cooling, resulting in the decomposition of a larger portion of it in thin graphite flakes throughout the cast

iron. It is this structure which gives the fracture of gray iron its characteristic appearance.

When rods of correct composition are used, the weld metal obtained is usually as strong as the original casting. The tensile strength of a cast iron weld is about 18,000 lb. per sq. in. and the transverse test of 1-in. square section, using a 12-in. beam, loaded at the center, is from 2000 to 2500 lb. with a deflection of 0.1 to 0.15 in.

Copper and Brass Welding

Rods used for filling welds in copper are made of copper to which has been added a small amount of phosphorus as a deoxidizer. Very encouraging results are being obtained in the tensile strength of the welded metal. Until recently only about 14,000 lb. per sq. in. tensile strength was obtained in copper welds, but improvements in rods have made possible the production of welds testing over 22,000 lb. per sq. in.

Brass is successfully welded, rods of the usual brass compositions being satisfactory for this use. There is some loss of the zinc content—about 2 or 3 per cent escaping as fumes. A suitable flux is always used in welding on brass or bronze. The flux forms a thin slag, coating over the weld and preventing oxidation and at the same time dissolving impurities and floating them to the surface of the weld. The most popular bronze welding rods are the manganese and Tobin bronzes.

Aluminum welding and soldering by the oxy-acetylene flame has a widespread use both in manufacturing and in the repair of broken parts. The welding of broken crank cases is one of the regular services offered by most up-to-date automobile repair shops. Rods of pure aluminum, as well as special rods of aluminum with zinc or copper additions, are widely used and have met with much success.

Quality of the Rods

Even though they may be of correct chemical composition, experience has shown that some rods are unsuited for welding. Any one of the manufacturing operations of melting, casting, rolling, cold drawing, etc., may not have been correctly handled, resulting in a faulty product.

Investigation of several curious failures of welding materials has focused attention on certain factors that

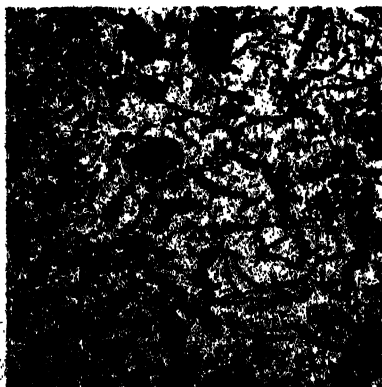


Fig. 16 (Left)--Gray Cast Iron Weld Junction, with weld metal on left and original cast iron on the right. Much smaller graphite plates in weld metal. Good fusion of the two metals and no impurities or hard spots can be observed. ($\times 50$)

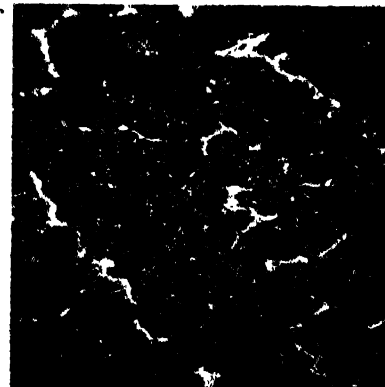


Fig. 17 (Right)--High-Speed Steel Weld Metal. This material has been correctly heat treated and has proved to be an extra good tool as shown by service tests. Most of the carbides have been absorbed during the heat treatment. The ground mass is martensitic with outlines of the original austenitic grains still remaining. ($\times 425$)

as yet remain somewhat obscure. Welding rods are encountered occasionally that are not satisfactory in their welding properties, even though chemical analysis of the material show that the proportions of the elements usually specified are correct. This trouble has not been found alone in rods but in certain lots of sheet metal, as was recently demonstrated in an investigation of sheet metal that did not meet the requirements of a certain manufacturer for welding. The rod was satisfactory, the equipment and welding procedure all that could be desired, and still it was not possible to make a satisfactory weld. Here again even most careful metallographic examination failed to reveal conclusive evidence of the cause of non-weldability. A simple test in which none of the factors of torch operation or gas fusion entered, proved that it was impossible to melt the given steel and obtain a solid fusion free from blowholes and sponginess.

This example is mentioned to illustrate that as yet we do not know all there is to be known of the physico-chemical reactions taking place when the melting of a welding metal occurs. The steel-maker and foundryman share with the welder some of the responsibility and should work with him in solving the problem of making better welds.

Physical Tests of Welds

Until very recently there was no recognized standard for the testing of welds. Leaders in the industry have recognized the need for a uniform practice in testing, so that a greater knowledge of the properties of welds will be available through the exchange and

assembling of information and test data. This need of standardization has been met by the American Bureau of Welding with carefully prepared specifications for testing welds, such that entirely comparable results will be obtained by experimenters who follow these specified methods of testing. The tests included are tensile, bending, fatigue, impact and metallographic.

Examination by X-rays is a new method of studying welds that of late has received considerable attention. Any slag inclusions, blowholes, or interface in metal, up to 2 in. in thickness, may be detected by this radiographic examination.

Microscopic Examination

The microscope is almost an unfailing aid when a study of the physical properties of a metal is undertaken. The examination of the entire surface of a large metal section at high magnification is very tedious and points of greatest importance might frequently be missed. The study of macrostructure has been developed to help in avoiding these difficulties.

The grains in the weld are coarser than those of the parent metal. There is no undesirable sharp demarcation at the point of junction between the two metals, but by the thorough fusion of the metals a gradual change of structure takes place in passing from the weld to the plate material.

The accompanying photomicrographs have been prepared to illustrate characteristic examples of various welding metals. Some show impurities or defects that should be avoided. All were etched with 5 per cent solution of nitric acid in alcohol.

PRESIDENT FARRELL'S CALL

Ninth National Foreign Trade Convention to Be Held in Philadelphia in May

James A. Farrell, chairman of the National Foreign Trade Council and president of the United States Steel Corporation, has called the foreign traders of the whole country to meet in Philadelphia, on May 10, 11, 12. In issuing the call for this convention Mr. Farrell said:

"Energetic efforts in the past year have been directed towards that restoration of stable economic conditions in international commerce, which must be accomplished if the world is to return to normal activity and prosperity. During the year the foreign trade and the domestic trade of all countries have suffered alike, although in varying degree in different countries.

"The severe and prolonged decline in prices everywhere resulted inevitably in a slowing down of commerce and industry, due to uncertainty as to ultimate values. The continued recession in prices and accompanying reduction in producing costs, has permitted a degree of competition for business in certain commodities in the world's markets, while the approach of prices to pre-war levels, or to the cost of production, has stimulated renewed buying and substantially increased the world's buying power.

"So far as the United States is concerned, the turn of the tide is apparently here, and despite the sharp decrease in values, the volume of our foreign trade is materially greater than before the war, and in many lines has increased notably in recent months. In certain directions, however, the meeting of foreign competition, reinforced by subnormal costs of production arising from depreciated currency, continues an important question for discussion and solution.

"The financial and production problems of Europe, also, are still unsolved and until solved the lessened consuming power of markets which have been large buyers of American products will continue to retard the natural expansion of our trade.

"A general survey of the world's merchant marine now in operation would indicate that ocean freight rates are now below the cost of carrying. The effect of this situation in its various aspects on the American Merchant Marine demands earnest consideration of all interested in the perpetuation of our foreign trade and shipping.

"To study the means of promoting the necessary restoration of the power of production and consumption in all the great markets of the world; to examine the conditions confronting our international commerce; and to obtain the judgment of experienced business men on many matters of vital importance to all the American people, the National Foreign Trade Council will hold the ninth national foreign trade convention in Philadelphia, on Wednesday, Thursday and Friday, May 10, 11 and 12, 1922.

"The Financing and Expanding of Our Foreign Trade" will be the central theme of the Convention.

"Americans engaged in foreign trade and connected with any factor of our international commerce, agricultural, commercial, industrial, financial or transportation; all chambers of commerce, boards of trade, national and State associations and other commercial and industrial organizations, as well as firms and individuals, are cordially invited to participate individually or by appointment of delegates.

"Your co-operation in the effort, through the ninth national foreign trade convention, to make more effective the national services rendered by foreign trade, is earnestly invited."

Mining Exhibit at Brazilian Exposition

The work of the various bureaus of the Interior Department in promoting the mining industry of the United States will be shown at the exhibit of the United States Government at the Brazilian Centennial Exposition at Rio de Janeiro in September of this year. The Secretary of the Interior has designated Thomas T. Read, Chief of the Information Service of the Bureau of Mines, as the representative of the Interior Department on the executive committee which is to co-operate with the Commissioner General, Col. D. C. Collier, in making arrangements for a suitable exposition of the activities of the Government of the United States.

The Greendale Mfg. Co., screens, and the business of John F. Murphy, dies, both of Worcester, Mass., are to be taken over by a new company, the Murphy Die Co., recently incorporated, and will specialize in dies for gaskets. John F. Murphy is president of the new concern, John W. Murphy, vice-president, and W. L. Hubbard, secretary and treasurer.

UNION LABOR ATTITUDE

Extreme Position Taken in Hearing Before Interstate Commerce Commission

WASHINGTON, Feb. 14.—Determination of organized labor to contest strongly reductions in rail labor was made clearly evident by testimony given before the Interstate Commerce Commission last Friday and Saturday, in connection with the general rate investigation, by Frank J. Warne, when he spoke for practically all of the railroad unions, the railway department of the American Federation of Labor, and other organized labor groups. Their counsel, Attorney Glen E. Plumb, conducted the direct examination of Mr. Warne.

In the face of the obvious fact, emphasized not alone by railroad executives, shippers, and the public generally, that general reductions in railroad rates cannot be made unless wages have been deflated, Mr. Warne made the remarkable contention that there is no economic law that establishes any relation whatsoever between rates as such for transportation, and rates of wages for services performed. Employees, said Mr. Warne, "believe this is an economically sound document, the observance of which cannot lead this commission astray from the facts of the situation which now confront it in this hearing."

It was evident that organized labor was pleased that it was given two days to present its views in this important hearing, and the press agent, speaking for Mr. Warne, who in turn claimed to represent labor organizations comprising 1,750,000 employees on all the railroads of the country, declared that "the appearance of Mr. Warne was said to be the first time in the 34 years of the existence of the commission," when these railway labor organizations were a party of a rate case.

"It is considered as significant of a striking tendency in the industrial development of the country as regards the widening gulf between employers and employees and the increasing magnitude of the stage upon which the issues between them are to be fought out."

This belligerent note was sounded throughout the testimony of Mr. Warne and was taken as an indication that organized labor, at least, was prepared to take a militant attitude against reductions in wages, though there are those who believe such an attitude is largely an outward manifestation rather than one that would be carried to extremes.

It was interesting to observe that out of the large list of organizations for which Mr. Warne spoke, the Brotherhood of Railway Trainmen was not included. It was stated that the exclusion of this organization was deliberate. W. G. Lee, president of the Brotherhood of Railway Trainmen, it will be recalled, disagreed with other labor leaders in the threat to strike last October, and apparently there still is a rift between this organization and the others. This has led to the belief that organized labor groups do not possess the solidarity which they pretend, though there is no denying that if they went to the extent of striking before submitting to rail reductions they could at least temporarily paralyze transportation in the United States. Mr. Warne attempted to bring in considerable extraneous matter which was ruled out by the commission.

Unemployment in Pennsylvania

HARRISBURG, PA., Feb. 14.—The metal trades of Pennsylvania are in the most stagnant condition of Pennsylvania industries, according to the semi-monthly report for the last half of January, just submitted on unemployment conditions in the State to Clifford B. Connelloy, commissioner of the State Department of Labor and Industry.

Little activity is reported in any of the 10 districts of the State. The Altoona office reports that work is practically at a standstill. Erie declared that at a meeting of the Employment Managers' Association of Erie it was the opinion of those present that their forces would not be increased during February. McKeesport reported a slight improvement, but Harrisburg, Johnstown and Pittsburgh announced no better-

ment. Philadelphia said that the Baldwin Locomotive Works, which has a total force of about 6000 men at its Spring Garden and Eddystone plants, has cut operations from three to two days a week, while all the machine shop trades are dull.

Unemployment, as a whole, decreased during this period, although Philadelphia, Altoona, Erie and Harrisburg reported an increased number of men out of work. The reports showed a total of 313,835 unemployed in the various districts on Feb. 1 as compared with 315,860 on Jan. 15, and 321,893 on Jan. 1.

Labor Clash at Yorkville Plant

WHEELING, W. VA., Feb. 14.—Although the Wheeling Steel Corporation has succeeded in resuming operations at its Yorkville, Ohio, works, a tin plate plant of 24 hot mills, which has been idle since last June as a result of the refusal of the company to renew its agreement with the Amalgamated Association of Iron, Steel and Tin Workers, the effort is meeting with some resistance, and on the night of Feb. 7, a clash between mill guards and picketing strikers resulted in the death of one of the strikers and the wounding of another. This is the only flareup that has occurred, but the situation still is tense as members of the Amalgamated association, aided by union miners, have formed a cordon of pickets around the plant and are making a strong effort to prevent the return of the plant to its status as an "open shop," as it was prior to the war, and which the management probably would have maintained had it not been for political pressure exerted at the time from Washington.

In explanation for the refusal to renew its agreement with the Amalgamated association last June, the Wheeling Steel Corporation officials claimed that the labor organization, at its annual convention in Hamilton, Ont., had passed a resolution demanding that the Wheeling Steel Corporation sign an agreement as a unit and thus embrace all its units, some of which, notably LaBelle Iron Works, had been "open shop" works. Amalgamated officials denied such a resolution and that they were merely trying to get the Wheeling Steel & Iron Co., one of the Wheeling Steel Corporation subsidiaries, to renew the agreement which they claimed it had previously broken.

None of the companies of the Wheeling Steel Corporation was represented at the wage conference between independent sheet and tin plate manufacturers and the Amalgamated association at Atlantic City last June, nor at Columbus, Ohio, where a fresh conference was held; following the failure to reach an agreement at Atlantic City. The company posted notices of its intention to deal direct with its employees, but since most of them were affiliated with the union they withdrew when the agreement expired by limitation June 30, last, and the Yorkville plant suspended operations.

About 10 days ago the company announced its intention of starting up Feb. 7, and invited former employees to go to work, offering wages somewhat above the current scales in union mills, but upon the basis of dealing direct with the men and the non-recognition of the union. Three mills were started and have since continued in operation.

In the Field of Labor

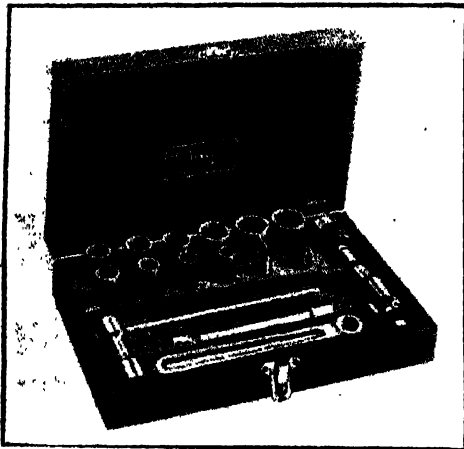
The Government's curtailment in naval construction work has resulted in 1000 men being laid off at the Fore River Works, Bethlehem Shipbuilding Corporation, Quincy, Mass., leaving 1800 men at work there, contrasted with 6500 a year ago and 18,000 during the war. Work on the superdreadnought Massachusetts and the battle cruiser Lexington has been suspended. The Massachusetts is 11 per cent completed, and the Lexington 35 per cent. Work on two scout cruisers and 16 submarines has not been discontinued.

The Bay State Foundry Co., Katherine Street, Westfield, Mass., closed for more than a year, will shortly resume operations, having secured a large contract from Cleveland manufacturers and others. Heretofore the plant was engaged almost exclusively in work for the Brien Heater Co.

New Socket and Ratchet Wrench Set

The socket and ratchet wrench set shown in the illustration has been placed on the market recently by the Eastern Machine Screw Corporation, New Haven.

There are ten sockets to the set, fitting 7/16 to 1 in. hexagon nuts. The method of manufacturing the sockets is a feature emphasized, the hexagon openings being made by drilling the hole to a diameter corresponding to the diagonals and drawing in the metal to form the hexagon. The result of this process is said to be a compressing and toughening of the metal permitting a reduction of the usual heavy wall to a thinness which permits the socket to fit where a thicker socket could not. It is also said to result in a socket



Sockets Are Made by Drilling Hole and Drawing in the Metal to Form the Hexagon

one third stronger than usual. Another improvement featured is the provision of strong hexagon head for the socket, all of the wrench parts fitting over this head for turning. The sockets are heat treated and hardened by three processes which involve carbonizing, refining and final hardening.

The T-handle has a cross bar which is adjustable for use in the central position or in the position for maximum leverage. The ratchet is set for either right or left hand use by raising or reversing the position of a ball-head pin. An extension piece is used between the T-handle and the socket either to turn nuts difficult to reach or to bring the handle into a more favorable position. A universal joint milled from bar stock is provided for turning nuts located at difficult angles.

The set includes two screw driver blades which fit any of the wrench attachments. The box wrench has a hexagon hole to fit any of the sockets and is used to get at nuts when the space above the socket is limited. This is a drop forging and is hardened by the cyanide process. The female part of the wrench attachments is provided with a split screw made from spring steel, which provides the necessary friction to hold the different parts together while in use. The tool box is strongly made of wood.

Fluorspar in Japan

WASHINGTON, Feb. 14.—Fluorspar is produced in small quantities in Ise province and also at Hotatsusan province, Japan. Acting Commercial Attache Hulleck A. Butts, Tokyo, says in a report to the Bureau of Foreign and Domestic Commerce, but the domestic product is of such poor quality that the greater part of the demand is supplied from foreign sources. The principal sources of supply are Korea, Manchuria and South China. So far as it was possible to ascertain, none is imported from the United States.

The total amount of fluorspar used in the Japanese steel industry during 1920 amounted to 285 metric tons.

The present open-hearth capacity of Japanese steel works is given as 2471 tons. There are 105 furnaces.

Because of the small amount imported, fluorspar is not listed separately in any of the Japanese trade statistics, the report says, nor has it been possible to secure this information in any other way.

It is pointed out that there do not seem to be encouraging prospects for the importation of the American product. The Japanese steel industry, it is explained, is not in a flourishing condition, and in addition will be still further depressed by the putting into operation of provisions of the Washington conference relating to limitation of armaments. In addition, it is stated, American producers will have to meet the competition of nearby producers who are much more favorably situated with regard to transportation costs.

Navy Yard Workers Laid Off

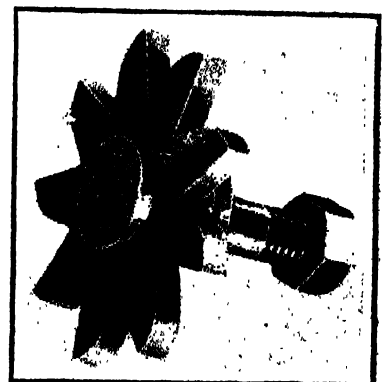
WASHINGTON, Feb. 14.—The effect of the conference on the limitation of armaments became pronounced upon workers in Government navy yards last Thursday, when, without previous notice, they claimed, they were "furloughed" without pay. The Washington Navy Yard dismissed 1350 employees and several thousand others were "temporarily" laid off at the Philadelphia, Norfolk, and Mare Island, Cal., yards, while the Naval Ordnance plant at South Charleston was ordered by Secretary of the Navy Denby to close at once and to lay off without pay, until June 30, all employees except those necessary to maintain and protect the plant.

The action of the Government has caused the different unions representing the trades affected by the order to organize a campaign to have the Government turn the navy yards over to the production of peacetime material as well as ordnance work being done at private plants. While considerable demonstration is being made in connection with this move, it is evident that it is considered impracticable and that it will not avail anything.

It was stated that most of the steel for naval vessels, which is to be scrapped under the provisions of the conference on the limitation of armaments, has been shipped, except the armor. But contracts for both steel and armor, as well as electric power equipment, etc., intended for the ships, have been held up and ultimately will be cancelled if the treaties are ratified. This will be followed by work of making readjustments with the private contracting firms.

Tool to Prevent Clogging Metal Saw Teeth

Much of the breakage of metal-saw teeth has been caused by chips from the cut clogging the gullets of the teeth, putting strain on the teeth and often causing them to crack and break. An automatic device intended to eliminate this trouble has been placed on



Device to Prevent Breakage of Metal Saw Teeth Caused by Chips Clogging the Gullets of the Teeth

the market by Henry Disston & Sons, Inc., Philadelphia. The tool shown is called the Disston chip remover. It consists of a special sprocket wheel, made to fit any type of saw, and a stud to carry the wheel.

If the saw teeth and gullets are free from chips, the saw will cut easier and smoother, and on this basis it is claimed that a saw equipped with the new chip remover can be run faster and at a little heavier feed. Chips from the cut often stick to the sides and points of the saw teeth, scoring the work and resulting in a rough, uneven cut. In keeping all parts of the saw teeth free from chips the chip remover is said to produce a smoother, cleaner job. These difficulties have been particularly noticeable when cutting soft stock or in the case of unusually large stock.

The European Steel Industry To-day

American Engineer's Comparison with British and German Pre-War Conditions—Keen Interest in Plant Reconstruction

AN extended study of European steel conditions has just been completed by a prominent American blast furnace engineer. Last July, H. J. Freyn, president Freyn, Brassert & Co., Chicago, left this country for a three-months' business trip to England, Belgium, Holland, Germany and other countries, with which was to be combined a study of the general situation. The field was so large and the opportunities so diversified that the time was extended to seven months. Mr. Freyn returned last Sunday on the George Washington and granted an interview in New York to a representative of THE IRON AGE. Only some of the more important facts which naturally were developed by such a thorough contact with the iron and steel industries of those countries are possible of reproduction here. The value of the knowledge gained may be partly judged by the statement that Mr. Freyn talked, in many cases for hours at a time, with about 300 different persons in the iron and steel industry in the various countries.

Among the results of the business phase of the trip was the establishing of two European branches or connections of this blast furnace engineering firm. A British company has been organized in London under the name of Freyn, Brassert & Co., Ltd. In Germany connections have been established with the German company, Gutehoffnungs Hütte, at Oberhausen. The former branch will cover the British field while the German connection will look after the interests of the Chicago company in continental European and other foreign countries. Not only will the adaptation of American blast furnace and other steel equipment to European practice be a feature of this business but the introduction of the McKune open-hearth furnace will also be advocated. The Chicago company recently secured the American and foreign rights to this Canadian invention.

In commenting on the trip in general, Mr. Freyn stated that his outstanding impression is the "great kindness and truly extraordinary hospitality with which I was received everywhere I went. I made the acquaintance of nearly 300 people engaged in the iron and steel industries of England, Germany, Belgium, Holland, Austria and Czechoslovakia, all of whom showed me the most friendly consideration and facilitated my work by their kindly interest. I owe all these men a debt of deep gratitude which it is a pleasure and privilege to acknowledge."

Keen Interest in American Methods

The interest in American methods of making pig iron and steel was everywhere an outstanding impression of Mr. Freyn—due largely to the changed economic and industrial conditions following the war. In his opinion post-war conditions in Europe are comparable with those which existed in America even before the war; the general plane of living of the working classes has been raised, labor is much more independent and less efficient. The 48-hr., and in certain countries the 45-hr., week has been legally established. "I have met not one person who claims that these conditions are the temporary result of the general upheaval caused by the war and that conditions will come back to the pre-war level." On the contrary, the conviction prevails that a new era is dawning, said Mr. Freyn, and that he who is unable to adjust himself to the new order cannot expect to survive.

About half of Mr. Freyn's journey was in England and the other half on the continent, particularly Germany. Business exigencies necessitated his going back and forth a number of times from one country to another, so that unusual opportunities were afforded to observe the changes which took place from time to time, thus insuring a more careful study of conditions

and not making it necessary to generalize and possibly create wrong impressions, as is often done by some newspaper and magazine writers.

Conditions in the British Industry

After describing the prostration of the British steel industry in July and later when the price of coke and labor was so high that economic production was impossible and when continental iron was being sold, f.o.b. Antwerp, at prices several pounds sterling below the cost of production in English blast furnaces, Mr. Freyn said that conditions gradually improved so that some furnaces which had been damped down as long as nine months, were again blown in until, at the time of his leaving England early in February, perhaps 25 per cent of the furnaces were in operation. Everywhere he was told that the British industry was in a distressed condition which must continue until the greatly increased cost of raw materials and labor as well as the high taxes and transportation charges are removed.

Much has been accomplished in the last few months in revising wages downward, but Mr. Freyn was told that no steel plant in Great Britain is able to-day to produce at a profit, for iron and steel products are being sold in small volume only and at prices considerably below cost of production, entailing great financial losses which must be covered by reserve funds accumulated during war prosperity.

The Wage Situation in England

"Several British plants are being operated in only one or two departments a few days each week," said Mr. Freyn, "for the following reasons: The managements desire to keep their workmen in food and shelter without abandoning them to the demoralizing effects of becoming recipients of the government unemployment dole. This is a commendable altruistic viewpoint, not dictated by law—as is the case in Germany—but is entirely voluntary. It is thus possible to take full advantage of the opportunity provided by wage agreements with the unions to bring down wages to a reasonable level compatible with the general deflation which has been under way for some time. Wages are paid on a sliding scale based on the ascertained price of certain steel products; when sales are made below manufacturing costs, a readjustment of wages takes place and it is greatly to the credit of the British workmen and to the spirit of fairness, justice and honesty that these reductions are being made almost without opposition."

"That a further curtailment of wages alone will be entirely insufficient to reduce costs to a level where competition will be possible at present world market prices is best shown, pointed out Mr. Freyn, by the statement of one prominent producer that he could not manufacture at a profit even though the entire labor costs in his plant were eliminated. Hence the cry for a quick lowering of taxes and for a radical cut in freight charges which, before the recent small reduction, were said to be three times as high as in the United States.

Future of British Steel Industry

Mr. Freyn, after stating that it was the consensus of opinion that no lasting improvement in the British iron and steel industry can be expected as long as the rate of exchange on continental countries, particularly Germany, remains as unstable and vacillating as it is, said that he heard much speculation concerning the future. There are those who take an extremely pessimistic view of the outlook. Ultimate prosperity is expected, however, though it may be some time in coming. Pointing out that England has wonderful coal and ore

resources and an energetic and fair-minded people with the training and experience of centuries, Mr. Freyn feels that this last asset cannot be over-rated. "It is this political and industrial high level which she has attained that accounts for her success in the past," said Mr. Freyn. "This will undoubtedly be duplicated in the future because the aftermath of the war has begun to break down the one factor which enlightened Englishmen themselves have pointed out to me as a serious handicap, i.e. conservatism. There are signs on every hand to prove this assertion; they can be found in every day business and social life as well as in the more specialized field of the iron and steel industry. The British iron and steel master knows exactly where the shoe pinches and it is superfluous to point out to him that some of his plants and especially his blast furnaces are obsolete and inefficient. Plans for reconstruction and modernization are being made everywhere and lack of the necessary capital is the only reason why they are not being carried out. The English steel maker has quickly recognized that a revolutionary change has taken place in economic conditions. I think that no country needs reconstruction of plant as urgently as England. Many existing old hand-filled blast furnaces, some of which date back scores of years and which produce such very small daily tonnages even on rich ores and good coke must either be abandoned or remodeled. The tendency in England, as well as on the continent for that matter, must henceforth be in the direction of larger producing units and the elimination of labor wherever possible."

German Industry Busy

The German steel industry is very busy, said Mr. Freyn, and many changes are apparent. Plants are working day and night on three 8-hr. shifts. It is noticeable that there is small difference in the wages between skilled and unskilled labor which is true of all countries except England, where compensation is on a tonnage basis.

One of the most interesting developments, said Mr. Freyn, is the "Wärmewirtschaft" at Düsseldorf which is an organization engaged in studying fuel economy from every angle. It serves 250 plants and some remarkable results have been attained. Each plant has a heat department or "Wärmestelle" and in one case an expenditure of 10,000,000 marks resulted in the saving of 40,000,000 marks. Electric locomotives in plants and waste heat boilers are more numerous and even gas engines have waste heat boilers installed.

In blast furnaces, Germany is using less and less minette ore, but is smelting larger quantities of Swedish ore, which is now being crushed in Sweden. This has resulted in a larger output, one German furnace having averaged 700 tons per day and one or two days made as high as 811 and 844 tons, the scrap charge being only 12 per cent. In reply to a question, Mr. Freyn said that German steel practice was turning gradually more to open-hearth as compared with basic Bessemer.

In gas producers, Mr. Freyn reported that the rotary kiln was being largely used—a kiln developed during the war to make lubricating oil from tar, based on the principle of the low temperature distillation of coal. There have also been developed 4-cylinder gas engines, having a gas cylinder diameter of 59 in. and 6000 hp.

Electric Cleaning of Furnace Gas

Much interest has developed in both England and Germany in the cleaning of blast furnace gas by electric precipitation. Wet washing in Germany is, however, widely used, particularly where there is plenty of water; the Dorr thickener also excited much interest. Mr. Freyn said that a new German electric precipitation process was mentioned which had a velocity of 13 ft. of gas per second and which was small in size, but details were not available. German regulation of gas pressure has also been widely developed so that constant pressure can be depended upon and the study of powdered coal for metallurgical purposes was being carefully pursued, so poor is Germany in good coal. Mr. Freyn reported also the development of a boiler which efficiently burns brown coal containing 50 per cent of moisture.

Everywhere great interest, both in Germany and England, was awakened in the claims for the McKune furnace of greater steel production at a lower cost.

As an instance of the present state of activity in Germany, Mr. Freyn reported the case of an interview with one German manager at 10:15 p. m., and also the fact that 2000 Germans attended the November meeting of the German Iron and Steel Institute at Düsseldorf, where he witnessed unusual enthusiasm. "Financially, however, Germany is a house of cards and a collapse is expected sooner or later."

Asked as to whether coke-oven gas and tar were being used extensively on British or German open-hearth furnaces, Mr. Freyn replied that this practice was the exception. But he was emphatic in the opinion that American by-product coke practice is far ahead of even German methods. In too many cases in both countries, such plants are located at the collieries instead of at steel plants and the results are not comparable to those in this country. More regularity in operation and uniformity in materials are necessary, he said. The heavy construction of German blast furnaces, their complicated machinery and large ore bins were a striking impression, as contrasted with the simpler construction and mechanism of our larger American furnaces.

Holland's American Blast Furnaces

Holland will have a modern American blast furnace plant in the near future, said Mr. Freyn. His company is building two blast furnaces at IJmuiden, near Haarlem, Holland, on the coast, one of 250 tons daily capacity and the other of 300 tons. The first will be ready late this year. The name of the Dutch company is Koninklijke Nederlandsche Hoogovens en Staalfabriken, with offices at the Hague. The total cost of the plant will be between \$7,000,000 and \$8,000,000. Imported ores are to be used but fair coking coals from the Limburg province will be coked in the company's own coke-ovens. The pig iron will be exported.

The Belgian and Czechoslovakian Industries

The situation in Czechoslovakia was described by Mr. Freyn as at present hopeless. The industry there consists of about 80 per cent of that of the former Austro-Hungarian Empire and the population of the new country is only 13,000,000 against 40,000,000, for the whole steel industry before the war. With a 30 per cent tax on coke and with a labor element radically inclined, very little could be expected, although the industry is now busier because orders which German mills cannot take are going to Czechoslovakia.

The Belgian industry was not regarded as prosperous or on a sound basis, according to Mr. Freyn. The attitude of labor is a deterrent factor. It is less efficient than in the other countries and is prone to take advantage of the government unemployment compensation and even migrate to France to spend it. Plants generally are not operating as in other countries. In Germany labor is really better off than before the war and although the cost of living may be 25 per cent higher than in 1914, wages are perhaps 30 per cent higher. But in all those countries it is the middle class that is suffering, even to the point of actual destitution in many instances, labor being much better off.

Consolidations of British and of German Companies

Consolidation of interests in Germany and in England is a marked tendency, said Mr. Freyn. In Germany combinations are now becoming horizontal instead of vertical in the steel industry and in England family ownership and the close control of directors are gradually to disappear in his opinion.

That there is a thorough change in the European viewpoint of steel-making operations and conditions, and that there is a broad opportunity for any one to suggest the application of new ideas to present processes, Mr. Freyn is enthusiastically convinced; not that the transference of an American blast furnace or mill to Europe will solve their problems but the adaptation of some of our principles to their problems will be eagerly and respectfully listened to and even sought.

Steel Corporations Unfilled Orders Declined in January

The unfilled business on the books of the United States Steel Corporation as of Jan 31, last, amounted to 4,241,678 tons, or 26,736 tons less than reported on the books, Dec 31, 1921. In December, the unfilled tonnage increased 17,872 tons, in November and October, decreased 85,287 and 273,841 tons, respectively, and in September increased 28,744 tons, while from August, 1920, to August, 1921, there was a decrease each succeeding month. A year ago the unfilled business amounted to 7,573,164 tons, or 3,351,486 tons more than on the books Jan 31, last. The monthly unfilled tonnage since January, 1920, compares as follows:

	1922	1921	1920	1919
Jan 31	4,241,678	7,111,414	9,251,111	6,811,265
Feb 28		6,933,517	9,000,881	6,010,187
Mar 31		6,281,771	8,992,077	4,310,172
Apr 30		5,452,224	10,159,117	1,800,686
May 31		5,152,487	10,930,111	1,521,310
June 30		4,117,868	10,978,417	4,892,818
July 31		4,803,324	11,115,415	75,861
Aug 31		4,519,226	10,905,008	6,101,101
Sept 30		4,060,670	10,374,804	6,541,635
Oct 31		4,505,229	8,836,812	4,472,018
Nov 30		4,054,212	9,021,451	7,128,210
Dec 31		4,219,414	9,148,122	9,215,301

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec 31, 1910, at 2,605,747 tons.

Chicago Industrial Engineers Meet

The Chicago chapter of the Society of Industrial Engineers held the second meeting of a series of eight on the "Stabilization of Industry" at the Auditorium Hotel, Chicago, Tuesday evening, Feb 14. Discussion at this session was confined to "The Wastes of Uneven Production." F. G. Becker, general manager, Hubbaud Steel Foundry Co., Chicago, acted as chairman, while the speakers on the program included C. E. Knoepfel, president C. E. Knoepfel & Co., Inc., industrial engineer New York, and H. S. Gilbertson, secretary market committee, Chicago Federation of Clothing Manufacturers. The third meeting of the series will be held at the same place on March 14, and the subject of discussion will be "Effects of Modern Sales and Advertising Methods Upon Stabilization."

Boiler Makers Meeting

PITTSBURGH, Feb 13.—The winter meeting of the American Boiler Manufacturers Association, held here to-day in the assembly room of Fort Pitt hotel brought together more than two thirds of the membership of the organization. The program as outlined in THE IRON AGE, Feb 9, was carried out in full and there was also a brief talk near the conclusion of the session by David J. Champion, president Champion Rivet Co., Cleveland, on the materials situation. A. G. Pratt, Babcock & Wilcox Co., New York, president of the association, presided. Members were asked to send in suggestions as to the place of the spring meeting.

New Ruling in Cost-Reporting Case

WASHINGTON, Feb 14.—Justice Bailey of the Supreme Court of the District of Columbia, last week announced that a date will be set for argument upon the motion of attorneys representing the Claire Furnace Co., and other iron and steel makers to strike out the amended answer of the Federal Trade Commission in the so-called cost reporting case. The other motion of attorneys for the plaintiff to strike out parts of the amended answer was overruled "without prejudice to the right of the plaintiff on the further hearing on the second motion to raise objections to matters not properly pleaded."

Permits were issued in Chicago in January for 457 buildings, fronting 14,968 ft and involving a cost of \$7,991,550, as against 166 structures for the same month last year, involving a frontage of 6,215 ft., and a cost of \$4,119,900. Thus there was an increase of 218 buildings, 8,753 ft. of frontage and \$3,872,650.

BRITISH FOREIGN TRADE

Steel Exports Again Increased in December—Imports Declining—Year's Total Small

The upward swing in British steel exports, which has characterized recent months, was continued in December, according to official data just made public. The total was 211,314 gross tons, excluding iron ore and including scrap. This compares with 202,059 tons in November and is second only to January, 1921, with 213,114 tons. A year ago, or in December, 1920, the exports were 191,057 tons.

The total exports for last year were 1,738,616 tons, or less than the 1920 exports by 1,557,231 tons. In 1919 these exports were 2,262,232 tons.

Iron and steel imports in December were 132,463 tons and the total for the year was 1,832,808 tons, which compares with 1,543,299 tons in 1920. The December imports have gradually declined from the peak of 229,391 tons in September. The following table shows comparative data:

British Steel Exports		Imports		Gross Tons	
				Exports	Imports
Average per month first quarter 1921	183,373			183,373	186,049
Average per month second quarter 1921	109,670			109,670	96,320
Average per month third quarter 1921	111,804			111,804	160,787
Average per month fourth quarter 1921	131,651			131,651	168,687
October 1921	161,783			161,783	189,526
November 1921	202,059			202,059	184,064
December 1921	211,314			211,314	132,463
Average per month 1921	185,719			185,719	50,801
Average per month 1920	214,881			214,881	128,686
Average per month 1919	144,885			144,885	152,734
Average per month 1918	420,757			420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports		Gross Tons	
		Average per Month	December
		1921	1920
Pig iron	75,711	8,015	15,149
Steel rails	41,676	11,213	10,827
Steel plates	11,112	11,711	17,701
Galvanized sheets	6,006	1,211	1,114
Steel bars	20,321	30,311	11,780
Thin plates	41,208	2,118	20,910
Black plates	179	0,611	1,111
Steel sheets			4,717

Exports of steel rails, galvanized sheets and tin plates have shown the most marked recovery in the above products.

Imports of pig iron in December were 51,767 tons and for the year they were 255,030 tons against only 152,462 tons in 1920. These have been a feature of the 1921 imports.

Iron ore imports in December were 144,669 tons against 528,628 tons in December, 1920. The year's total was only 1,887,074 tons as compared with 6,449,551 tons in 1920. Last year's imports were the smallest in many years.

Manganese ore imports for 1921 were small at 172,856 tons or the lowest in over 10 years. In 1920 they were 422,612 tons.

Ore Rates Hearing

Hearings on upper lake ore rates before an examiner of the Interstate Commerce Commission will be resumed at the Great Northern Hotel, Chicago, in the near future, March 6 being the date tentatively set for the first day's session. These hearings were interrupted owing to the necessity of the railroad witnesses to appear before the commission at Washington during January and February. The taking of testimony has proceeded to the point where practically all that remains is the offering of rebuttal by the shippers.

The first open meeting and informal dinner of the recently organized Pittsburgh Chapter of the Society of Industrial Engineers will be held at the Fort Pitt Hotel, Pittsburgh, Friday evening, Feb 17. C. E. Knoepfel, president, C. E. Knoepfel & Co., Inc., will be the speaker, his subject being "Waste or Wages—Which?"

HOBBING SPROCKET TEETH

New Universal Hob Replaces Sets of Cutters
Formerly Used Problems Met in Hobbing
Sprocket Teeth

BY G. M. PARIETTE

THE principle of generating the teeth of interchange-
able involute gears by reference to a rack with
straight sided teeth is well known and the application
of this principle to the hobbing of such teeth is also
well established. Sprocket teeth, however, are still cut
almost entirely by the ordinary rotary cutter it being
generally supposed that the range of teeth which could
be correctly cut by a single hob is necessarily limited
and that a large number of expensive hobs would be
required to properly equip a shop for sprocket cutting
by this means.

A set of hobs each of which is capable of cutting
any number of sprocket teeth of a given pitch and
roller diameter has been developed by the engineering
department of the Diamond Chain & Mfg Co., Indian-
apolis. One of these hobs is shown in Fig. 1. They
effect a considerable saving in cutter equipment where-
ever hobbing machines are in use since a single hob
will do the work that has hitherto required a set of
from six to nine cutters. There is also a further sav-
ing due to the greater rapidity with which an entire
sprocket can be cut on a hobbing machine and a still
further advantage due to the assurance of accurate
indexing which is characteristic of such machines.

The hobs are designed to cut sprocket teeth in
conformity with the specifications for the new Ameri-
can standard tooth form which has been approved by
the principal manufacturers of roller transmission
chains in the United States and by the Society of Auto-
motive Engineers, the American Society of Mechanical

number of teeth, and is less than the circular pitch of
the sprocket for all under that number. The imaginary
circle which rolls upon the theoretical pitch line of the
rack is sometimes larger and sometimes smaller than
the pitch circle of the sprocket.

The effect of making the pitch of the hob either
less or greater than the circular pitch of the sprocket
is shown in Figs. 2, 3 and 4. In all three cases, the
same hob was used, and the pitch of the sprockets was
altered by changing the diameter of the pitch circle.
Figs. 3 and 4 show that if the hob pitch is less than
the circular pitch of the sprocket the tooth curves tend
to be more convex, the angle of the tooth space tends to
be greater and the teeth are more pointed at the ends;

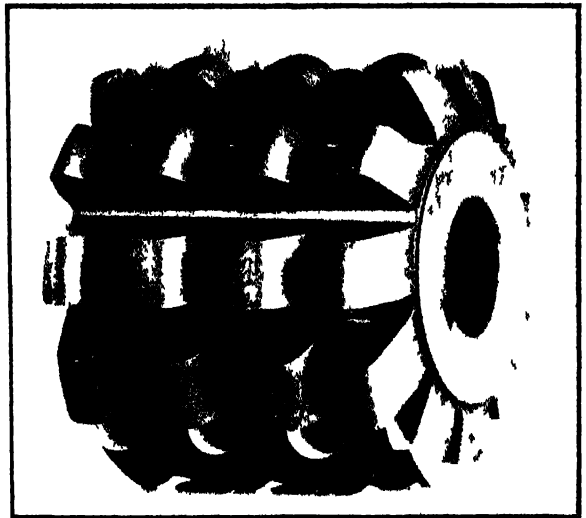


Fig. 1. Universal Hob for Cutting Sprocket Teeth

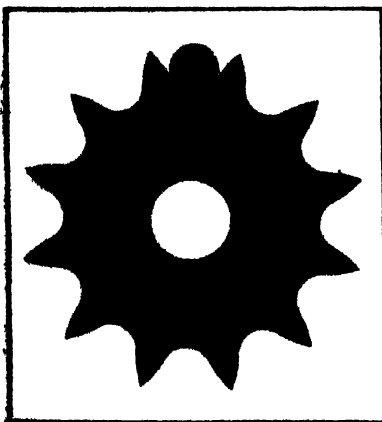


Fig. 2

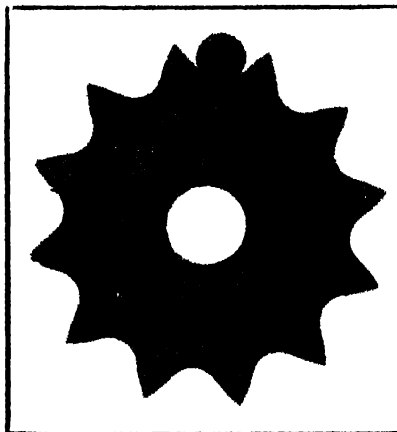


Fig. 3

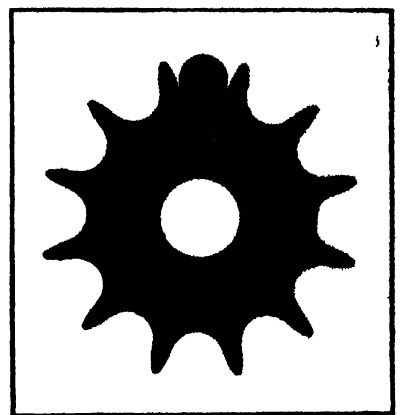


Fig. 4

Figs. 2, 3 and 4 show the effect of the pitch of the hob being less or greater than the circular pitch of the sprocket

Engineers and the American Gear Manufacturers As-
sociation. This tooth form is peculiarly adapted to the
hobbing method since it neither requires a constant
"space angle" as in the British system nor a constant
tooth angle as in some systems in use in this country.
Its space angle gradually decreases as the number of
teeth increases and its tooth angle, and hence its pres-
sure angle, gradually increases. The generating action
of a hob tends to produce these same changes although
not at the same rate.

The hobbing of sprocket teeth and of gear teeth
presents problems which differ in several respects. With
spur gears the circular pitch is constant for all num-
bers of teeth, but with sprockets the circular pitch de-
creases as the number of teeth increases. The curva-
ture of the teeth of spur gears becomes sharper as we
approach the base circle. With sprockets it is desirable
to increase the radius of curvature as we approach the
lower, or acting part of the tooth and finally to change
the curve from convex to concave. The pitch of the
hob for spur gears is always equal to the circular pitch
of the wheel, while with sprockets it is greater than
the circular pitch of the sprocket for all over a certain

while if the hob pitch is greater than the circular pitch
of the sprocket, the reverse conditions are true.

When the hob pitch is properly determined and the
tooth contour properly designed, the entire range of
tooth numbers from size to infinity can be cut without
varying from the prescribed shape as much as the
various teeth do within the range of any one rotary
cutter of the ordinary type.

Hobs made to cut sprocket teeth of the American
standard tooth form were supplied by the Brown &
Sharpe Mfg Co., Providence, R. I., the Illinois Tool
Works Co., Chicago and the Union Twist Drill Co.,
Athol, Mass.

W. C. and Arthur A. Schrage and Clyde P. Crane,
of Detroit, have organized the Crane-Schrage Steel
Co., of Detroit, to sell cold-finished steel products in
that territory. R. L. Linder will be associated with
the company as sales representative. All were long
identified with the Pittsburgh Shafting Co.

The Philadelphia and Reading Coal and Iron Co. re-
pair shops in Pottsville, Pa., will be operated five days
a week instead of four, it has been announced by offi-
cials.

Chief Engineer Diamond Chain & Mfg Co.

Collection of Price Information Is Legal

Correspondence Between Secretaries Hoover and Daugherty Results in Pronouncement as to Activities of Trade Associations

WASHINGTON, Feb. 15.—As a result of prolonged consideration of activities of trade associations as affected by the recent so-called Hardwood decision by the Supreme Court, it has been decided not to issue a formal statement but to publish the correspondence between Secretary of Commerce Hoover and Attorney General Daugherty.

Secretary Hoover, in a long letter dated Feb. 3 wrote to Attorney General Daugherty, discussing trade associations in a general way and expressing the opinion very earnestly that trade associations can have a lawful form of organization and be extremely useful. Without making any reference to the Supreme Court decision, Secretary Hoover expressed a desire for informal expressions as to the following activities on the part of trade associations and their members wherein neither the form of the association nor the activity, which appear perfectly fair and lawful on the surface, is used to hide or conceal some contract, combination, conspiracy, agreement, or understanding, secret or otherwise, on the part of the association, the membership, or any part thereof to actually restrain trade or otherwise violate the Sherman act:

Secretary Hoover's Questions

(1) May a trade association provide for its members a standard or uniform system of cost accounting and recommend its use, provided that the costs so arrived at by the uniform method are not furnished by the members to each other or by the members to the association and by the latter to the individual members?

(2) May a trade association advocate and provide for uniformity in the use of trade phrases and trade names by its respective members for the purpose of ending confusion in trade expressions and for harmony of construction as to the meaning of trade phrases, names, and terms?

(3) May a trade association, in co-operation with its members, advocate and provide for the standardization of quality and grades of product of such members, to the end that the buying public may know what it is to receive when a particular grade or quality is specified; and may such association, after standardizing quality and grade, provide standard form of contract for the purpose of correctly designating the standards of quality and grades of product; and may it standardize technical and scientific terms, its processes in production, and its machinery; and may the association co-operate with its members in determining means for the elimination of wasteful processes in production and distribution and for the raising of ethical standards in trade for the prevention of dishonest practices?

(4) May a trade association collect credit information as to the financial responsibility, business reputation, and standing of those using the products of the industry; and may the association furnish such information to individual members upon request therefor, provided such information is not used by the association or the members for the purpose of unlawfully establishing so-called "blacklists."

(5) May a trade association arrange for the handling of the insurance of its members, including fire, industrial, indemnity, or group insurance. In other words, can the members of an industry, through the agency of a trade association, arrange for or place all of the insurance of the members?

Co-operative Advertising

(6) May a trade association, in co-operation with its members, engage in co-operative advertising for the promotion of trade of the members of that association engaged in the particular industry; and may the asso-

ciation engage in such form of promotion by furnishing trade labels, designs, and trade-marks for the use of its individual members?

(7) May a trade association, for and in behalf of its members, engage in the promotion of welfare work in the plants or organizations of its members, which welfare work includes sick benefits and unemployment insurance for employees, uniform arrangements for apprenticeship in trade education, the prevention of accident and the establishment of an employment department or bureau for co-operation with employees?

(8) May a trade association, in co-operation with its members and acting for and in behalf of its members, handle all legislative questions that may affect the particular industry, regarding factories, trades, tariff, taxes, transportation, employers' liability and workmen's compensation, as well as the handling of rate litigation and railroad transportation questions?

(9) May a trade association, in co-operation with its members and acting for and in their behalf undertake the promotion of closer relations between the particular industry and the Federal and the State departments of Government which may have administration of laws affecting the particular industry in any form?

(10)-A. May a trade association collect statistics from each member showing his volume of production, his capacity to produce, the wages paid, the consumption of his product in domestic or foreign trade, and his distribution thereof, specifying the volume of distribution by districts, together with his stock, wholesale or retail?

B. And may such trade association, on receipt of the individual reports of each member, compile the information in each report into a consolidated statement which shows the total volume of production of the membership, its capacity to produce by districts of production, which, in some instances, include a state or less area, the wages by districts of production, the consumption in foreign or domestic trade by districts, the volume of distribution by districts, and the stocks on hand, wholesale and retail, by districts?

Filing with Secretary of Commerce

C. And if, after compiling the information as aforesaid, the information received from the members as well as the combined information is not given by the association to any other person, may it then file the combined statement with the Secretary of Commerce for distribution by him to the members of the association through the public press or otherwise and to the public generally and to all persons who may be in any way interested in the product of the industry, it being understood that the individual reports for the members should cover either weekly, monthly, quarterly, or longer periods as may be deemed desirable by the members, and, when a period is adopted, the report for each member shall cover that period, and the combined report shall be for that period?

(11)-A. May a trade association, at the time it collects the production and distribution statistics above outlined, at the same time have its members report the prices they have received for the products they have sold during the period taken, specifying the volume of each grade, brand, size, style, or quality, as the case may be, and the price received for the volume so sold in each of the respective districts where the product is sold?

B. And may the association, without making known to any person the individual price reports of any member, consolidate all of the reports into one, and show the average price received for the total volume of each, grade, brand, size, style, or quality, as the case may be, distributed in each district covered by the distribu-

tion statistics for the period covered by each individual report?

General Distribution

C And may the association, after making such compilation, send the compiled report as to average price, as aforesaid to the Secretary of Commerce, to be by him distributed to the public and to any or all persons who may be interested in the particular industry making the report

In conclusion Secretary Hoover said

"In order to avoid repeating this question in connection with each one of the activities outlined in the above preceding question, may trade associations engage in any or all of the activities named without violating the law provided the organization and the activity engaged in are not for the purpose of hiding or concealing some agreement contract, etc., to actually restrain trade or otherwise violate the anti-trust laws?"

"As stated in the beginning, I do not ask you to express your views in a formal opinion, but it is my hope that you may see your way clear to give me the advice that will enable me to adopt the proper administrative action in undertaking the duties imposed upon the Secretary of Commerce by the organic act creating the department. It is unnecessary for me to say that the general, unsettled condition regarding the proper provinces of trade associations justifies as early a reply to these inquiries as your other numerous official duties will permit."

Attorney General's Reply

Attorney General Daugherty's reply is as follows

Feb 6, 1922

My dear Mr Secretary

Your communication of the 3d instant relating to the practices in which trade association may lawfully engage was received. I recognize the force of your able discussion of the subject, and after careful consideration of the several activities which you suggest can be exercised lawfully, I beg to say

With reference to the first paragraph, there is no apparent objection to a standard system of cost accounting, but I think associations should be warned to guard against uniform cost as to any item of expense. For illustration, a strong effort has been made by some lumber associations to take as a basis for estimating costs of production a uniform charge for stumpage. Of course the cost of the timber in the tree to the different manufacturers who own their timber in the woods greatly varies, and as to each it should be charged at its actual cost. It is as clearly a violation of the law to agree upon the cost of an item that constitutes a substantial part of the total cost price when its cost actually varies, as to agree upon the sale price, because the sales price is substantially affected by such agreement. It has been ascertained that the members of one association go so far as to fix a uniform cost price leaving to each member to determine what per cent profit he will add thus eliminating entirely competition in so far as affected by the cost of production.

Furthermore, I have serious doubts about the advisability of the latter part of the sixth paragraph. I can see no objection to co-operative advertising designed to extend the markets of the particular article produced or handled by the members of an association, but when the several producer or dealers use uniform trade labels designs and trademarks it seems to me the inevitable result would be a uniformity of price. Where two competing articles are advertised in precisely the same way and bear exactly the same label or trademark it certainly would be difficult for one to be sold at a higher price than the other, although its quality may be superior. In a way this is illustrated in the cement industry. Here a standard of quality has been adopted. That is, it is necessary for all cement to comply with a certain standard, but in practice no manufacturer undertakes to make, or at least no one advertises that he does make, a grade of cement superior to that standard. The result is that there is no competition in the sale of cement so far as quality is concerned. It seems to me therefore that it would be well to eliminate the latter clause in paragraph six, to wit, "and may the association engage in such form

of promotion by furnishing trade labels, designs and trade-marks for the use of its individual members?"

I can now see nothing illegal in the exercise of the other activities mentioned, provided always that whatever is done is not used as a scheme or device to curtail production or enhance prices, and does not have the effect of suppressing competition. It is impossible to determine in advance just what the effect of a plan when put into actual operation may be. This is especially true with reference to trade associations, whose members are vitally interested in advancing or, as they term it, stabilizing prices, and who through the medium of the associations are brought into personal contact with each other. Therefore the expression of the view that the things enumerated by you, with the exceptions stated, may be done lawfully is only tentative, and if in the actual practice of any of them it shall develop that competition is suppressed or prices are materially enhanced, this department must treat such a practice as it treats any other one which is violative of the anti-trust act.

Yours sincerely,

H M DAUGHERTY,

Attorney General.

Hon Herbert Hoover, Secretary of Commerce, Washington.

Secretary Hoover's Second Letter

The last letter of the series is from Secretary Hoover and is as follows

Feb 9 1922

My dear Mr Attorney General

I have your letter of the eighth instant in reply to my letter to you of Feb 3 1922 in which I made informal inquiry as to the legality of certain activities of trade associations enumerated in 11 questions. It is very pleasing to me to note that our views regarding these matters are in such close harmony.

Your observations regarding the last clause in question (c) in my letter are wholly sound based on the language of that clause. It was not however my idea that each constituent member of a trade association would use a community trade mark on his product under the same trade mark that was used by every other member of the association and therefore the last clause in that question was unhappily worded. The question really relates to trade promotion through co-operative advertising in which certain trade slogans are used such as Made in Grand Rapids which was adopted by the furniture manufacturers at that furniture center. Generally activities covered in question (6) are conducted by a trade association in a given local community. An organization at Chicago advertises for its entire membership which includes every line of commercial endeavor in Chicago that the city is the great central market. It is co-operative advertising of this class that tends to promote trade extension in given lines or collected lines of industry. Certain of the trade associations however, do devise trade marks not for use by all members but by individual members. It is a well known fact that when some manufacturer or producer is fortunate enough to select a trade mark that appeals to the public it becomes a great aid in selling his commodity and as a result it is well advertised until it becomes a household word. Other producers or manufacturers of the same kind of an article, in order to take advantage of this situation will devise a trade name or trade mark as near to that of the successful competitor as they think they can get and thus the result under the trade mark or unfair competition laws. The activities of a trade association regarding trade marks to which I referred in my letter of the third relate to the straightening out of instances of unfair competition or infringement between its members by undertaking to design trade marks for the individual members of the association making the same product that would absolutely prevent confusion on the part of the public as to the producer or manufacturer of the given article and at the same time, remove all claim of infringement or unfair competition. In other words the trade mark activity referred to was that of making the trade-marks of each individual member distinctive instead of common. You may therefore consider the part of my question (c) referred to in your letter as eliminated from the question and that the question was really intended to cover the matters stated herein. With this explanation I feel sure you will agree with me that our views on the matters presented are in complete accord.

Yours faithfully,

HERBERT HOOVER,

Secretary of Commerce

Honorable Harry M Daugherty,

Attorney General, Washington, D. C.

BASING POINT HEARING

Examination of Witnesses by Federal Trade Commission Continues at Milwaukee

MILWAUKEE, WIS., Feb. 14.—At the close of the second week of the Milwaukee hearing, the first of a series of hearings scheduled to be held on the complaint of the Federal Trade Commission against the United States Steel Corporation, seeking the abolition of the alleged Pittsburgh basing point practice, from 12 to 14 witnesses remained to be called, indicating that a third week will be required to complete the Milwaukee hearing before the commission moves on to Minneapolis for the second of the series.

The monotony of the hearings was interrupted on Friday, Feb. 11, when M. W. Torkelson, chief bridge engineer Wisconsin State Highway Commission, and Arthur Peabody, state architect of Wisconsin, were called as witnesses. Their testimony was introduced by the reading into the record of the proceedings of a joint resolution adopted by the Wisconsin Legislature at its biennial session a year ago, seeking the abolition of the Pittsburgh basing point practice and declaring in effect that the State and people of Wisconsin are prevented from receiving the benefits of the close proximity of this state to the vast iron ore deposits of Northern Wisconsin, Upper Michigan and Northern Minnesota, by the alleged discriminatory effect of such practice.

Karl E. Steinhauer, attorney for the Federal Trade Commission, introduced the resolution and called the two State officials as witnesses, he said, to illustrate the attitude of the public toward the alleged discriminatory practice. W. W. Corlett, general solicitor of the Steel Corporation, objected on the ground that public interest was not an issue in the present action, inasmuch as the commission itself had brought the complaint at the instance of a certain group or groups of manufacturers whose interest has not been shown to be the public interest so far. The objection, however, was overruled by John W. Bennett, trial examiner.

Mr. Torkelson testified that he has been for 14 years State bridge engineer of Wisconsin. In the last seven years, he said, 25,087 tons of steel have been consumed in the construction of steel and concrete highway

bridges, while an estimate of the probable consumption in the next 20 years is 200,000 tons, based on the expectancy of the construction of 30,000 highway bridges in the same period.

Mr. Peabody, State architect, testified that 1323 tons of steel have been consumed in the construction of State buildings in the past five years, and that similar work in the next four years as projected would require 1495 tons.

The testimony of Messrs. Torkelson and Peabody agreed on the point that all of this steel had been purchased by contracting companies, numerous officials of which have appeared as witnesses at this hearing, upon whose testimony written into the record they based a belief that public work cost the taxpayers of Wisconsin an excessive amount due to the alleged discriminatory effect of the Pittsburgh basing point.

Testimony of other witnesses called during the past week developed approximately the same evidence as that of witnesses testifying during the first week of the hearing in Milwaukee. In a general way, witnesses invariably admitted that their invoices showed that material was billed to them f.o.b. Milwaukee, but they insisted that analysis of prices showed that the sales were made on a Pittsburgh base and freight from Pittsburgh to Milwaukee was added, regardless of the location of the mill from which the material was actually shipped. THE IRON AGE usually was quoted as authority for quotations upon which fabricators based their contention that they paid a Pittsburgh base price.

Witnesses examined during the past week included the following: Henry M. Merz, vice-president Milwaukee Bridge Co.; Eugene W. Krueger, Worden-Allen Co.; W. D. Johnson, president Milwaukee Boiler Mfg. Co.; John F. Henry, president Milwaukee Structural Steel Co.; C. E. Stone, Chain Belt Co.; O. E. Lindemann and A. T. Fish, of A. J. Lindemann-Hover-son Co.

Witnesses who appeared Monday at the beginning of the third week of the hearing were: A. T. Fish of A. J. Lindemann-Hover-son Co., manufacturer of hot air furnaces, stovepipe and similar goods and Edwin D. Bartlett, secretary and H. H. Marvin, purchasing agent, Milwaukee Stamping Co. Their testimony was largely a reiteration of that by previous witnesses in these lines.

Complaint of Columbia Steel Co. Dismissed

WASHINGTON, Feb. 14.—The Interstate Commerce Commission has dismissed the complaint of the Columbia Steel Co. against the Elgin, Joliet & Eastern Railroad, et. al., holding that rates on fire brick from transcontinental groups A, D, E and J. to San Francisco, Oakland, Emeryville, Pittsburgh and Anderson, Cal., all within the description of California terminals, are not unduly prejudicial against the points named in comparison with northeast terminals, although they are higher and the mileage is about the same. The dismissal also applies to complaints of the Judson Mfg. Co., and the Afterthought Copper Co. The commission, however, orders the transcontinental lines to revise their rates so as to bring them into harmony with the revised fourth section, forbidding rates at intermediate points higher than rates at the more distant points for no greater mileage.

Suits Against Carbon Steel Co. Discontinued

Two suits, filed in United States district court, Pittsburgh, naming the Carbon Steel Co. defendant, were discontinued Feb. 9 after Judge Thomson signed orders dismissing the bills of complaint. One suit was brought by the State of New Jersey to recover \$38,918.06 as taxes, damages and court costs. The taxes, according to the bill, were imposed on the company for the years of 1893, 1894 and 1895, when the Carbon Steel Co. was a corporation operating under the laws of New Jersey. On April 4, 1913, in a suit of the State of New Jersey against the Carbon Steel Co., the New Jersey Supreme Court gave judgment in favor of the

State in the amount of \$38,918.06, representing \$12,000 debt, \$26,880 damages for detention of debt and \$38.66 court costs. The company was later incorporated under the laws of West Virginia and the State of New Jersey attempted to collect the amount through the Federal Court in Pittsburgh. The motion filed by the steel company, Jan. 20, 1919, asked that the bill be dismissed, giving as reasons that the court had no jurisdiction and that the bill on its face was bad for want of equity. The other suit was brought by the Churchward International Steel Co., Wilmington, Del., alleging that the Carbon Steel Co. infringed on a patent regarding the self-hardening of alloy or iron and steel and alloyed steel. Both parties consented to the dismissal of the suit.

Frick Coke Co. Exonerated

UNIONTOWN, PA., Feb. 14.—Coroner's jury investigating the death of 25 miners who lost their lives in the Gates mine disaster at the Gates plant of the H. C. Frick Coke Company found that their deaths were accidental and resulted from a blown out shot, exonerating the Frick company.

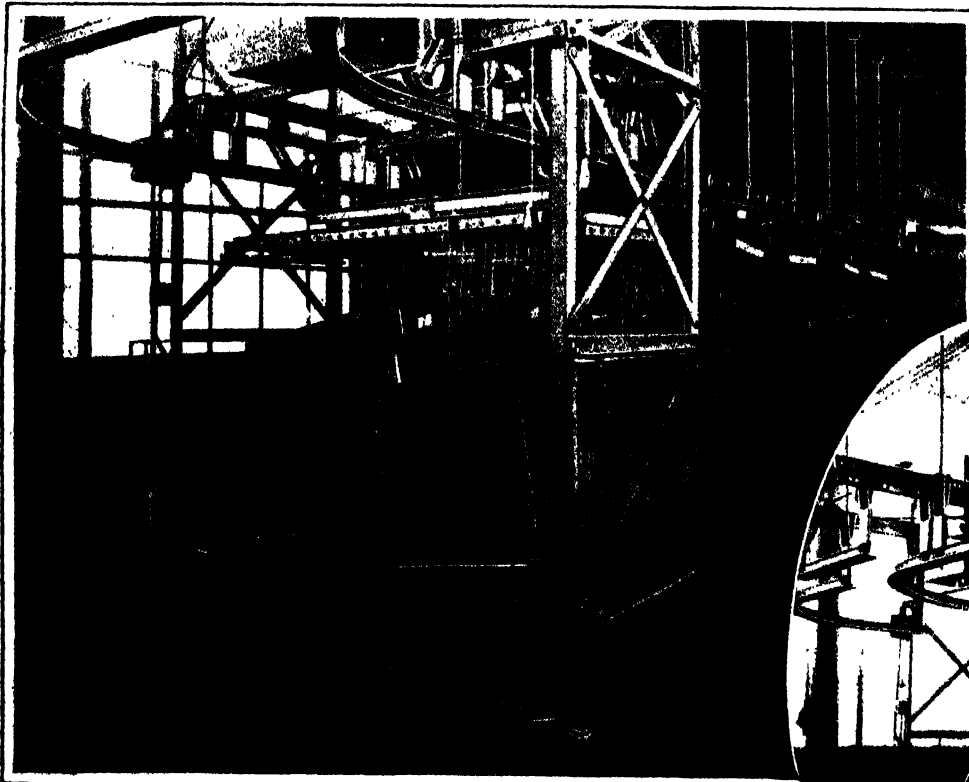
A new wire rod, wire and wire nail plant has been practically completed by the Minnesota Steel Co. at Duluth. All the necessary buildings have been erected and most of the equipment has been installed, with the prospect that operations will commence by June 1. The plant will have a capacity of about 300 tons per day or 100,000 tons per annum of various wire products. The output will be sold by the American Steel & Wire Co.

Conveyors for Painting and Baking

Manual Handling Avoided in Finishing Bulky Sheet Metal Parts in a Cleveland Plant—Overhead Tramrail and Suspended Racks Used

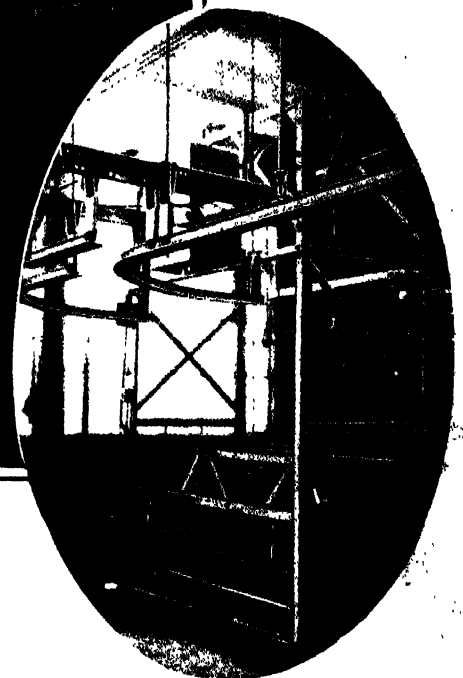
A CONVEYING system has recently been installed in the plant of the E. F. Hauserman Co., Cleveland, which is unique in that two operations, painting the material that is being conveyed and later baking it in an oven, are performed while the work is on the conveyor. Conveying systems that include carrying the work through an oven for baking after enamel or other coating is applied are not uncommon, but using the same conveying equipment in connection

As the tramrail is suspended from the roof, no special construction is required for supporting the hangers that carry the rails. The rack is moved lengthways on a single tramrail track until it reaches the painting department. Here a switch is provided at a 90-deg. turn in the track. The rack, instead of making this right angle turn, passes from the switch on to a double track tramrail with one of its carriers on each track and the position of the rack which had been



Elevator Lowered and Parts Submerged in the Paint Vat

Elevator After Lifting Parts from Paint Vat. Beyond are the dripping platform and loaded racks, the latter ready to go to the baking oven at the extreme right.



with the painting operation is the development of increased usefulness for an overhead shop transportation system and means the reduction of production costs.

The Hauserman company manufactures steel bins, shelving, partitions and kindred steel products, that might come under the classification of shop furniture. The work is painted after stamping, either in single parts or after a certain amount of assembling. Some parts are given a second coat of paint after assembling operations. Parts painted range in weight from a few ounces to 80 lb.

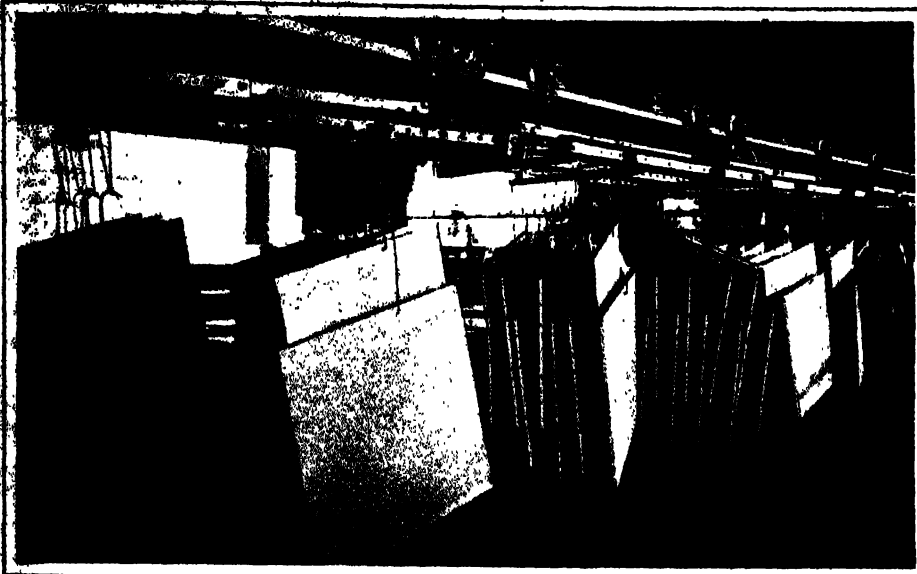
The conveying equipment consists of a tramrail system supplied by the Cleveland Crane & Engineering Co., Wickliffe, Ohio, equipped with this company's standard hand-operated carriers to which are attached steel frame racks, each rack being suspended from two carriers. The racks are 80 in. long and 25 in. wide, and are of a special design for handling the work which is suspended on wire hooks from cross-bars on the racks.

The tramrail system is 338 ft. long. It extends in a circuit around the plant from the sheet metal stamping department, through the painting department, the drying oven and on into the assembling department. From here the carriers and racks, after being unloaded, complete their circuit back for reloading.

lengthways in respect to the track becomes crossways.

The double track passes through a steel frame elevator shaft over a paint vat located in the floor. A short connecting section of the track is attached to a 1-ton electric hoist at the top of the elevator frame. After the loaded rack is pushed on the track above the paint tank a button is pressed and the hoist lowers its load into the paint, where it remains a few seconds. Then the elevator automatically reverses itself and raises the load to its former position. Then the carrier is pushed off the elevator and over the dripping pan located back of the elevator. The rack is pivoted from the center of a bar that connects the two carriers so that the rack can be swung either way 6 in., giving it a 12-in. incline from one end to the other, this tilting position being desirable for dripping. A locking device is provided for holding the rack in the tilting position.

After dripping, the racks are pushed a short distance into the baking oven, which holds six racks at a time. Near the discharge end of the oven switches are



Carriers Loaded with Unusual Shaped Metal Parts Ready to Go to the Paint Vat

provided similar to those in front of the paint vat and the racks are switched back on to a single tramrail track on which they move to the assembling department. To prevent loss of heat, a door section or cover is suspended from hinges above the oven doors, filling the space from the tramrail track to the top of the oven. When a carrier is pushed out of the oven the wheels lift this cover, which falls back in place when the carrier is out of the way.

The company finds that with the tramrail system it is saving 50 per cent or more in labor costs, now doing with five men work that formerly required 10 or 11 employees. With the old method of loading the oven by hand it took four or five men to carry the work in and out of the oven. Then, owing to the time taken for loading and to the delays in waiting for the oven to cool sufficiently for the men to enter it, only three or four lots were baked in the oven during the day. Now it is possible to bake nine or ten lots during a day. The usual maximum load is about 900 lb., although the conveyor has a 1-ton capacity. It is stated that with the use of the tramrail parts that formerly cost 35c. each to paint now are painted for 14c. and parts that cost 15c. to paint now are painted for 4c.

Opposes Transportation Commissioner

WASHINGTON, Feb. 14.—The National Council of the Chamber of Commerce of the United States at its

meeting here last week went on record as being opposed at this time to the creation of an office of a Federal commissioner general of transportation and to the taking of a referendum on the question of compulsory adoption of the metric system in the United States. Regarding the former subject the council in a resolution held that the time is inopportune for the establishing of a Government agency in charge of a commissioner general of transportation to present to the public interest in railroad questions. A recommendation by the Chamber's railroad committee that such a proposal be submitted to a referendum was disapproved by the council. The council, however, gave its endorsement to the recent action of Secretary of Commerce Hoover in appearing before the Interstate Commerce Commission as the representative of the public.

Hog Island Surplus Steel to Be Sold

WASHINGTON, Feb. 14.—Bids in writing for the purchase at private competitive sale of approximately 105,000 net tons of fabricated steel at Hog Island, Pa., will be received by the United States Shipping Board, Emergency Fleet Corporation, until noon, Feb. 15, at its office in the Navy Building, Washington. This is the last sizable lot of surplus steel the shipping board has to sell. The entire quantity of steel at Hog Island is physically separated by railroad tracks into seven lots, and may be sold either in its entirety or separately by lots as may appear most advantageous.

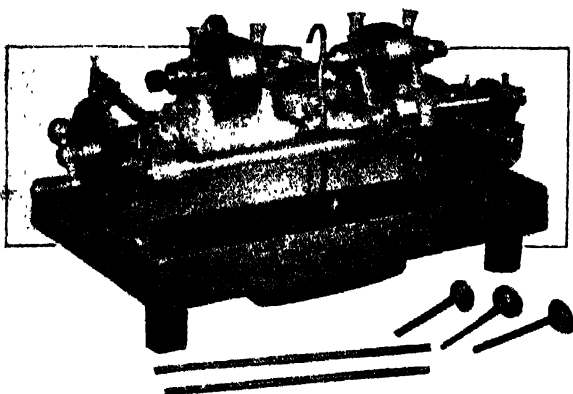
Tramrail Track Arrangement at Discharge Side of the Oven, Illustrating the Way the Carriers Leave the Oven. The racks run at right angles to the two rails that extend through the oven and by means of switches pass on to a single rail track and in doing so change their position in respect to the rail, the rack again moving in a lengthwise position along the rail as it did before being switched to the paint vat.



Duplex Valve Stem Milling Machine

A duplex valve stem milling machine, designed primarily for the quantity slotting of valve stems, has been put on the market by the Dale Machinery Co., Chicago and New York. Slots up to $\frac{1}{2}$ -in. wide by $\frac{1}{2}$ -in. long may be milled in valve stems $\frac{5}{8}$ -in. in diameter and smaller. By changing the work-holding vise, square, hexagonal and other shapes may be slotted and although designed for valve stems, the machine can be adapted to slotting small parts for a wide range of purposes.

In slotting valve stems it is usually the practice first to drill a hole and then to broach out to the desired



Although Designed for Valve Stems, the Machine Can Be Used to Slot a Wide Range of Other Small Parts

shape. The new duplex miller is intended to do this work in one instead of two operations and with greater speed. The work is held on a V-shaped vise as shown in the illustration, so that valve stems of any diameter within the capacity of the machine may be handled without using a different work-holder. The vise rests on a cross-slide which is operated by a connecting rod attached to a crank with an adjustable stroke. The crank is run from a pinion which engages a worm gear operated by pulley from a countershaft. A three-step cone pulley permits operation at three speeds. The length of the travel of the slide is controlled by adjusting the throw of the connecting rod.

The slots in the valve stems are milled out by tools working toward each other from opposite sides of the work slide. The tools are held in collets which are inserted in the ends of spindles, driven by pulley from the same countershaft which drives the gearing operating the work slide. The spindle carriages are driven in opposite directions by cams, the camshaft being operated by a ratchet wheel. The rotation of the ratchet wheel is accomplished by a pawl driven by a crank on a shaft, which in turn is actuated by a cam mounted on the shaft operating the cross-slide connecting rod. Thus the feed of the tools and the travel of the work slide are co-ordinated. At the conclusion of each revolution of the crank driving the cross-slide, the dog engaging the cam is released, thereby disengaging the pawl from the ratchet wheel and stopping the camshaft which controls the travel of the spindle carriages.

Prior to starting the machine, the carriages are set by hand so that the tools barely fail to touch. When the mills are fed into the work by the cams, one carriage is released before the other, one cam being of slightly different contour than the other. This arrangement prevents the mills from striking each other and at the same time permits one tool to complete the cut.

A self-contained oil system is provided. The machine is furnished with countershaft.

Pat Dwyer, associate editor, the *Foundry*, will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Pittsburgh, Monday evening, Feb. 20.

Feb. 4 marked the seventieth anniversary of the founding of LaBelle Iron Works, Steubenville, Ohio, and Wheeling, W. Va.

Monolithic Roof for Mill Buildings

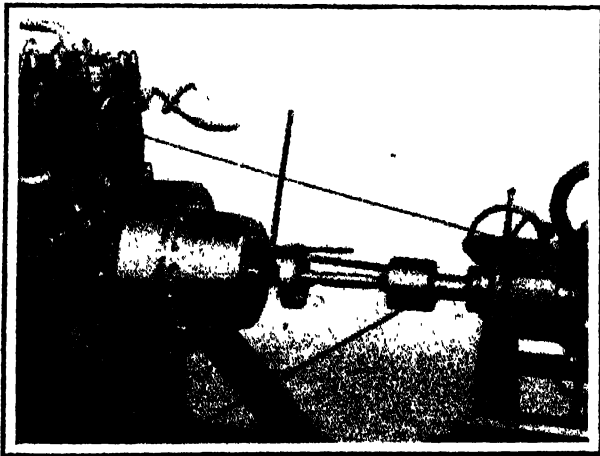
To push commercially a new monolithic roof for mill and industrial buildings, H. E. Marks, formerly president of the National Steel Fabric Co., which was taken over a few months ago by the Pittsburgh Steel Co., and previously vice-president and manager of sales of the H. H. Robertson Co. Pittsburgh, has opened offices in the Empire building, Pittsburgh.

The roofing system consists of steel T's supported on roof purlins, gypsum board panels, wire mesh reinforcements and a cast-in-place gypsum or concrete slab. Two sizes of T's are used. The main T's span from purlin to purlin, spaced 2 ft. 8 in. apart. The small or auxiliary T's are all 2 ft. 8 in. long and are simply laid (not fastened) in the main T's, to support the ends of the gypsum board at 3-ft. intervals. As the auxiliary T's are laid, the standard sized 2 ft. 8 in. x 3 ft. gypsum board panels are placed in position. After a row of panels has been placed, the reinforcing fabric of proper width, and cut to the exact length of the roof, is laid over the T's. The forms are then ready for the aggregate, which is poured into place, forming, with the wire fabric, a solid monolithic reinforced slab, of which the gypsum board and T's become an integral part. A light dead load, high load-bearing capacity, heat insulation value and a saving in steel in the trusses and general construction are emphasized as advantages.

Hydraulic Clutch for Heavy Duty

A hydraulic clutch intended to provide a means of applying automotive engine power to driven parts of the transmission with a smoothness of "take-up" closely approximating that of the steam engine has been placed on the market recently by the Williamson Hydraulic Clutch Co. Mt. Vernon, Ohio. This is accomplished through the use of oil as the power-absorbing agent.

The clutch has few bearing surfaces and all such are flooded with lubricant. No small or fragile parts are subjected to load pressure. Any setting of the control lever gives a constant reduction ratio through the clutch and there is effected a gradual absorption of en-



Hydraulic Clutch Attached to Minerva Engine with Dynamometer Shown at the Right

gine power, avoiding a lowering of engine r.p.m. At the same time, it is claimed, the power impulse is delivered steadily and evenly to the gear-reduction unit, rear axle and other driven members. There is no need for devices to prevent a too sudden grip; and lag, it is said, is automatically impossible. From this it may be inferred that the factor of power loss through transmission is materially reduced.

The new clutch is said to have been thoroughly tested over a long period of time and to have proven successful in passenger-car, heavy motor-truck, farm-tractor and machine-tool service.

The Acme Wire Co., New Haven, Conn., has received an order from the Ford Motor Car Co., Detroit, for 150,000 coils of wire. This order will require about six weeks to complete.

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ESTABLISHED 1855

THE IRON AGE

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Trade Association Activities

The long-expected announcement as to the policy of the Government in regard to trade associations has come in the form of correspondence between Secretary of Commerce Hoover and Attorney-General Daugherty. One of the causes for the delay was probably a desire not to seem to be over-officious or discourteous to the Supreme Court in interpreting one of its decisions. This has been averted by not referring to the Hardwood decision or making the pronouncement formal, but the declaration of opinion by the Attorney-General, answering the detailed questions of the Secretary of Commerce, will have much weight and will go far toward clearing up prevailing uncertainties.

Little doubt could have existed as to the legality of many of the activities mentioned by Secretary Hoover in his letter, but the all important question of prices is not dodged. The Secretary asks squarely whether trade associations may collect information as to prices received, specifying volume, grade, brand or quality, as the case may be, without making known individual price reports, and he inquires whether the compiled reports as to prices may be submitted to the Secretary of Commerce and by him distributed to the public, or to all persons interested.

The Attorney-General's reply in the last paragraph of his letter states that he sees nothing illegal in the activities described, provided this privilege is not used as a scheme or device to curtail production or enhance prices, and does not have the effect of suppressing competition. The Attorney-General naturally qualifies his declaration by pointing out the difficulty of determining in advance what the effect of the plan, when put into actual operation, may be, and he says that the expression of the view that the things enumerated may be lawful is only tentative, and if the actual practices result in curtailing competition or materially enhancing prices, the department must treat such practices as it treats any other which is violative of the anti-trust act.

This is a wise reservation, but Attorney-General Daugherty has not been guilty of any reckless proceedings and can be depended upon to act

with deliberation. Both he and the Secretary of Commerce are to be congratulated upon the termination of their many conferences, for they have thrown new light on important questions and it is now possible for many associations to know with reasonable certainty how they can legally carry on their operations.

The Bonus Bill

The proposed soldiers' bonus, whether viewed from the standpoint of patriotism or business, is indefensible. If considered from the economic standpoint, the statement of Secretary Mellon, showing how disastrous the payment of billions of dollars to the soldiers would be to the business interests of the country when it is imperative to do everything that can be done to hasten the return of prosperity, should have had immediate and final effect in stopping the passage of the bill, but politicians are still of the opinion that they will further their own interests by catering to the American Legion, or rather to that part of it which is clamoring for the bill. If further evidence of the folly of enacting the so-called adjusted compensation were needed, it is furnished by the evidence that is being presented that any and all of the forms of taxation or bond issuing proposed to meet the cost will interfere with recovery from the industrial depression.

There is, however, higher ground on which to base the opposition to the plan to compensate the soldiers. If it were possible to compensate them, it would and should be done, no matter how much business might be retarded, but the very thought of paying the soldiers for their great service and sacrifice is repulsive to any one who has the finer feelings about the matter. Probably no one has seen more of the heroism, the courage and all the magnificent record of the soldiers of the great war than has the distinguished war correspondent, Frederick Palmer. He shows the impossibility of adjusting the compensation of the soldier, who had greater reward than did the civilian who worked for a wage and was paid in full. Mr. Palmer says that by far the higher compensation lay in the honor accorded him and we would add that

ever greater comfort is found in the soldier's consciousness of having done his full duty to his country. Mr. Palmer states the whole matter in a nutshell as follows:

The truly patriotic soldier stands on a higher level than the ordinary citizen. The American Legion is proposing to sell that level for cash. Considering the vast difference between the two conditions, it is surprising that they are willing to sell out for so small a price per head. If the bonus bill passes, the button of the American Legion will show not the man who risked his life for his country, but will advertise its wearer as the man who sold his halo.

Opposition to the bonus does not, however, mean that the people of the United States are unwilling to take care of the disabled soldiers and sailors. The people of this country never have failed to be liberal in ministering to those who were wounded or overcome by sickness as a result of service in the army or navy. Although more has been undertaken in the way of vocational training and in the establishing of hospitals than after any other war, the service is yet woefully inadequate, and the nation demands that all the men who are weak in mind or body shall receive the best attention that skill can give them.

Appropriations for the disabled have increased from \$179,287,800 in 1918 to \$330,250,400 this year, and no patriotic citizen begrudges one penny of that amount. A bill passed last Saturday provided \$406,000,000 for 1923 and Senator Borah estimates that \$500,000,000 must be appropriated for every year from now on. Even those great figures do not stagger the country, nor does the statement that within ten years we will be appropriating \$1,500,000,000 a year for the disabled soldiers and sailors, and that the ultimate cost will be \$75,000,000,000. The country will gladly foot the tremendous bill, but it positively objects to putting patriotism on a commercial basis.

There has been all too much of a supine submission to assertions that the bonus measure was certain of passing. In the last few days a backward sweep of the tide seems imminent and if business would properly express its own force in legislative influence the tidal movement would be of no uncertain power. Sometimes it has seemed that business must all but storm Washington to drown the noise of the minority and convince the vote seekers that their proposed legislation would act as a boomerang in the November elections.

At one time constructive substitution, such as writing a law to conscript everybody, non-combatants as well as combatants, in another national emergency, might have been regarded as the way to fight the bonus movement, but the time has arrived to down it. Every business man—every man who can see the taxes beyond the temporary spending of a bonus distribution—needs to act immediately to convince his political representative that the thinking electorate is now against the bonus.

Although the depression last year was naturally communicated to the American ferromanganese and spiegeleisen industry, an analysis of the out-

put of these alloys, found elsewhere in this issue, shows that the ferromanganese production was only about 21,000 tons under that of 1913. The marked difference between 1921 and 1913 exists in the sharp decline in imports of the British alloy, which last year were only 755 tons per month against 10,672 tons per month in 1913. This would seem to indicate that the foreign alloy is by no means the factor that it used to be. The spiegeleisen production was less than 50 per cent of that of 1913 and the lowest in many years; none indeed was produced in the last half of 1921. While this does not reflect a corresponding decline in Bessemer steel, there was a sharper falling off in this kind of steel than of the open-hearth. Compared with the remarkable showing of the American manganese industry in 1918, the 1921 record looks insignificant, being less than one-fourth of the war stimulated production. The record last year indicates that American producers are able to take care of American needs, for in 1913 over half the consumption was of British origin.

Measuring the Steel Demand

Already definite evidence has appeared supporting the argument made in these columns a fortnight ago that 1922 may reasonably be expected to show a considerably larger production of steel than 1921, even without the aid of any material improvement in the general fundamental conditions of finance and industry. Already at this early date, with the advent of spring more than a month away by the calendar, the rate of steel production is at least equal to that of last autumn.

The particularly small production of steel ingots last year, about 19,500,000 tons, was due in part to liquidation of stocks of steel in the hands of distributors and manufacturing consumers and of various wares made from steel. The most pronounced symptom of such liquidation being in progress was the dip in steel production in July to a rate of only about 11,000,000 tons a year. In well-informed quarters it was held that the liquidation, except in a few cases, was practically completed by Oct. 1, and in October and November the rate of production was all of 23,000,000 tons a year. Then came December with an average rate under 20,000,000 tons and a rate in the last week of probably not more than 16,000,000 or 17,000,000 tons, the dip being incidental to the season.

The January ingot output of the 30 steel companies that report their total through the American Iron and Steel Institute indicates that the steel industry as a whole produced ingots in that month at an average rate of about 23,000,000 tons a year, and when this average rate for a month followed the low rate at the end of December, it is evident that there was a progressive and rapid increase, so that the rate this week is presumably well above 23,000,000 tons and may easily be 25,000,000 tons.

Yet the spring demand cannot be assumed to have worked its way, thus far, into the ingot production rate. The full spring demand has not

yet come, for buyers hold off as long as possible. When they do make up their minds they insist upon prompt shipment and the mills are in position to comply with their wishes. Thus the production of ingots facily moves up and down according to the demand for mill products.

The reasonable prospect is that the spring demand will bring an ingot production rate between 25,000,000 and 30,000,000 tons a year, comparing with a rate of 23,000,000 tons last autumn and an actual production in 1921 of 19,500,000 tons. The crest of each wave is higher.

The fundamental conditions are without doubt improving continuously, the improvement being plainly seen when comparison is made between dates a few months distant from each other. The ultimate consuming demand for steel and products of steel can be measured closely by observing the rate of steel ingot production, since the liquidation of stocks that characterized last spring and summer is out of the way. No basis can be found for assuming that when we have the plain prospect of a steel demand this spring, such as is mentioned above, there will not be as good a demand, and presumably a better demand still, next autumn. The summer, of course, is likely to be quiet. There is no reason to suspect that those who are buying steel now are making a mistake and will later regret their action, or will not have occasion to repeat their orders from time to time through the year. Capacity operation for the steel mills is not to be thought of for the near future, but it is already reasonably plain that steel production in 1922 will be much better, say one-third or one-half greater, than the production of 1921.

What Were Pre-War Conditions?

Sometimes a question breaks in abruptly and makes us look at things from a new angle—which is never a bad thing. For more than a year we have been talking about "returning to pre-war conditions" and "getting back to normalcy." Now, when we talk along that line, have we any definite conception present in the mind of precisely what the pre-war conditions were? Or are we simply thinking in general terms of "the gold old days" or the flesh pots of Egypt, forgetting the toil of the good old days, as the Israelites apparently forgot about the work that was much more conspicuous in their life in Egypt than the flesh pots?

As a matter of fact, in the twelvemonth and more preceding the outbreak of the world war, we were rather busy discussing business and economic questions, where we were in the business cycle, and whether a panic had been due and had been averted or a crisis had come and had not been recognized.

The best opinion seemed to be that we did not have either a panic or a crisis, but that we did have an industrial depression. Conditions had just begun to improve when the war broke out and the question was left unsettled whether the improvement represented a false start or the beginning of a general movement, for the war changed everything.

Just to give ourselves a little jab so that we

may sit up and pay attention, the production of pig iron by the steel works in July, 1914, the last month before the war, was 45,027 tons a day. Production last month was 42,130 tons a day. The difference is 6 or 7 per cent—not much to have a discussion about.

A strong argument was made in some quarters that conditions were all set for our having a panic or crisis in 1913, in rhythm with those of 1893 and 1873, but that the situation was so well understood and so many warnings had been issued that men set their houses in order and thus the panic or crisis was averted because foreseen, but an industrial depression is a different thing, and can come without a panic preceding. That something did occur is evident from the fact that the rate of pig iron production decreased by 32 per cent from February, 1913, to June, 1914.

It is characteristic of the business cycle that, in what is considered the depressed area, men become content to work harder and business men accept smaller margins of profit. Everything is liquidated and efficiency becomes the rule. By hard work and thrift, a buying power is built up. That was true in 1873-8 and in 1893-8. Those were periods of low prices and low wage rates, but by no means were they throughout periods of work not being done. In 1897 and 1898 men were working hard, and as efficiently as they knew how.

Perhaps there was no major depression due in 1913 or shortly afterward, but certainly no one felt during an entire twelvemonth or more before the outbreak of the war that we were in first-class shape economically and socially. That was by no means the pre-war condition, and we are dissipating our energy when we talk about getting back to pre-war conditions without reflecting just what those conditions were. The best of the pre-war conditions is one thing and the immediate pre-war conditions an entirely different thing.

If we purpose selecting the best of the pre-war times and returning to them, then we must do now what we had done then to obtain those conditions. The periods of good times before the war came as a result of hard work, careful planning, thrift, economy and invention. The war opened up no new road to prosperity and advancement. We must traverse the narrow path decreed by economic laws, just as we have always had to do.

Two impressive facts are emphasized by British steel export data, analyzed elsewhere in this issue. One is the continued expansion until December was second only to January of 1921. The recovery since July has outstripped American exports, which at that time were in excess of the British. The second noteworthy fact is that this recovery is almost exclusively in galvanized sheets, tin plates and rails. In December alone the gain in each of these three products over December, a year ago, was nearly three-fold, while in the case of American exports the December decline from the same month in 1920 was over 50 per cent in tin plate, nearly 70 per cent in rails and about 30 per cent in galvanized sheets. American steel exports fell last year to a figure less than 50 per

cent of the 1920 outgo; British steel exports in 1921 were 52 per cent of those in 1920. In 1913, rails, galvanized sheets and tin plate constituted, next to pig iron, the bulk of the British foreign sales, a business which the British are apparently rapidly regaining.

Relief for the patent office seems near at hand. The Lampert bill passed the House of Representatives by a vote of 305 to 44, and it has been favorably reported to the Senate by that body's patents committee. It may be well, however, for the industrial elements of the country to make its voice heard as strongly as possible by writing to senators. The bill provides more than sufficient funds for the increase of expenditures necessary, by increasing the filing fees for applications for patents by \$5, and it is therefore not dependent for success on any appropriation measure. That the American Engineering Council regards the bill as of fundamental importance should carry weight, seeing that that organization has studied the question and is non-political and non-commercial in its attitudes.

Practicing Engineers to Meet in Chicago

What is called the first annual conference of practicing engineers will be held in Congress Hotel, Chicago, Feb. 22. The program announces the following papers:

"Publicity for Practicing Engineers," by M. W. Lee, vice-president Frank D. Chase, Inc. "How to Uphold the Standards of Services and Fees," by Gardner S. Williams, consulting engineer, Ann Arbor, Mich. "Experiences of the Practicing Engineer with Licensing," by C. S. Hammatt, president National Council of Engineering Examiners. "How to Sell Engineering Services," by Paul E. Green, consulting engineer, Chicago. "Cost Accounting for Engineering Services," by Arthur L. Mullergren, consulting engineer, Kansas City. "Computing the Practicing Engineer's Income Tax," by Clarence W. Hubbell, city engineer, Detroit.

Warren Foundry Company Elects Officers

At a director's meeting of the Warren Foundry & Machine Co., Easton, Pa. last week the following officers and directors of the company were elected: William H. Hulick, president and treasurer; A. D. Chidsey, vice-president and assistant treasurer; directors, E. J. Fox, president Easton Trust Co.; Chester Snyder, president First National Bank, Easton, Pa.; W. Clayton Hackett, president Easton National Bank; Lee S. Clymer, president Riegelsville Bank, Riegelsville, Pa.; and W. H. Walters, attorney, Phillipsburg, Pa.

Francis B. Foley, metallurgist Minneapolis station of the Bureau of Mines, will present a paper on "The Annealing and Hardening of Steel" before the Washington Chapter of the American Society for Steel Treating, at Washington, on Friday evening, Feb. 17. He will discuss his own investigations into the effect of the methods of heat treatment as applied to various materials.

C. A. How, purchasing agent of the Missouri Pacific Railroad, is preparing to place contracts for more than 5000 tons of 90-lb. steel rails. The exact amount or the allocation of the order has not been definitely decided upon, and is being held up pending the return to St. Louis of B. F. Bush, president of the railroad, who is ill in the South.

WHERE IS PROSPERITY?

This and Other Questions Considered at Dinner of New England Iron and Hardware Association

The New England Iron and Hardware Association held its twenty-ninth annual dinner on Tuesday evening, Feb. 7, at Hotel Somerset, Boston, more than 200 members and guests attending. Fred L. Avery, Boston, president, presided. Hon. Samuel L. Powers was toastmaster. The guests of the evening included Hon. Channing Cox, Governor of Massachusetts; Hon. Samuel E. Winslow, Congressman from Massachusetts; W. Irving Bullard, vice-president Merchants' National Bank, Boston, and Austin H. Decatur, president National Hardware Association.

Mr. Decatur, in his address, took an entirely different view of the business outlook than he did a year ago when he spoke before the same association. He believes that business and industry have adjusted inventories sufficiently so that we may look forward with confidence. Mr. Decatur characterized business as still on the sick list, but he is confident its 1922 showing will be considerably better than the 1921, and that in succeeding years we may anticipate a gradual recovery of normal or better profits.

The subject of Mr. Bullard's address was, Where Is Prosperity? It took the form of a sketch of a recent trip abroad for the purpose of studying financial and industrial conditions, and the conclusions drawn by him. In Italy he found business and finances on the road to recovery, but in England, France, Belgium, Holland, Germany and in the other European countries visited, business, social and political uncertainty. Paper, he stated, is worth more in Europe as a commodity than as currency, and he returned to the United States convinced that real prosperity is here, where "85 per cent of our textile mills, 75 per cent of our shoe factories and 70 per cent of our steel mill capacity is in operation." Those present took exception to Mr. Bullard's figures on steel mill operations.

Mr. Winslow's remarks were confined largely to the problems confronting all Congressmen in Washington. He is convinced we have been misled by newspapers regarding the so-called agricultural bloc. He stated no such thing existed in the House. The East, he declared, does not realize the West has grown up, and that representatives of Western interests simply are doing no more for and showing no greater interest in those measures looking for the protection of Western business and industry, than Eastern representatives of peoples have been doing for years.

Because of its bearing on industry and business, Mr. Winslow spoke at length on the bonus question. He claimed representatives of the American Legion are threatening Representatives and Senators with political extinction if the bonus bill is not passed. So far as he knows, not one member of the American Legion has advanced even a suggestion as to how money for the bonus can be raised. While not making a direct statement, Mr. Winslow strongly intimated that industry and business cannot sustain any added taxation for the purpose of raising a bonus fund.

The Hanna Furnace Co., Cleveland, is planning to blow in its Dover furnace at Dover, Ohio, this week. This furnace has been out of blast 13 months. During that time, the furnace has undergone extensive repairs. Two new hot blast stoves and a new boiler plant and machine shop have been built and a turbo generator, several pumps and a gas washer have been installed.

The Union Street mill of the Edwards Iron Mills, Columbia, Pa., which has been idle for more than a year, was scheduled to be put in full operation on Feb. 15, according to an announcement of the owner, Edward T. Edwards. The puddling rate will be \$6 per ton. Several hundred men will be employed.

Iron and Steel Markets

OPERATIONS IMPROVED

Increase Slight But Less New Business

Tonnage Traceable to Railroads—Wire Lower Pig Iron Dull—Coke Higher

Operations of steel mills have improved slightly following the broadening scale of purchases last week, but fresh buying has fallen off somewhat, as is characteristic of the alternations of a replenishment market. Both consumers and jobbers are freer buyers, but only for immediate needs. The week's bookings have relatively few items of large tonnage.

The potentialities of railroad demand, in the light of recent equipment sales, are again encouraging producers. Meanwhile, new rail business calls for 23,000 tons, including 18,000 tons for the Chesapeake & Ohio, and three roads have bought 10,600 tons of tie plates, with 5000 tons from another pending. Active railroad car inquiries in the West exceed 8000 and an order has been placed by the Reading for 2000, the first of any size in the East in many weeks. The Lackawanna is considering repairs to 985 hopper cars.

The heavy tonnage products are none too steady, but the uninterrupted succession of reports of operating losses sustained by large producers appears to have done much to discourage belief in lower prices. Some observers regard possible freight rate reductions as already discounted. Producers emphasize that plates, shapes and bars, bringing 1.40c., Pittsburgh, to-day, averaged in 1913 1.55c. on bars and 1.50c. on shapes and plates and mills did not have to-day's freight, fuel and labor costs to absorb.

Following the reduction of wire nails to \$2.40 per keg, plain wire is now quoted at \$2.15. Incidentally, this brings THE IRON AGE composite price to 2.005c. per lb., the lowest yet on the receding movement which began in September, 1920.

Leading sellers of foundry, malleable and basic grades of pig iron in the Chicago district are making an attempt to advance the selling price to \$20, but the latest sales were made at \$18 to \$18.50 and the new quotation has not been established. Prices of Bessemer ferrosilicon and silvery irons have been reduced \$2 per ton. In nearly all centers, the pig iron market is extremely quiet and sellers are maintaining recent quotations with difficulty. At Pittsburgh, concessions have been made on foundry and malleable irons.

Makers of cold finished bars and of bolts, nuts and rivets have encountered some liquidating sales. These are taken to indicate the final clearing up of accumulated stocks in purchasers' hands. The Ford Motor Co. bought 10,000,000 nuts at a sharp concession.

The outstanding new item in fabricated steel

is 23,000 tons for a bridge across the Hudson for the New York Central. Outside of that, new projects total barely 10,000 tons and awards amount to about 7000 tons.

Tin plate mills are even more fully engaged than they were last week, independent mills in the Pittsburgh and Valley districts averaging close to 90 per cent of capacity.

Gas companies in Chicago and Milwaukee are in the market for 15,000 and 4000 tons, respectively, of cast-iron pipe.

Exporters look for business in semi-finished steel with Europe, matching low prices here with advancing exchange there. For the Far East, 17,000 tons of rails has been closed.

British producers of ferromanganese have advanced prices to \$62.50, seaboard, and American makers are expected to follow suit. Stocks of the higher grade of spiegeleisen have been exhausted and prices for the lower grades have been advanced \$5 per ton, or to \$30, furnace.

Coke prices have advanced as a result of demand in anticipation of a coal strike, 15 cents a ton, or to \$2.90 on furnace coke and 25 cents or to \$4 on foundry coke.

Pittsburgh

PITTSBURGH, Feb. 14.

The trend of the demand for finished steel products still is in the direction of improvement, and while the gains are seen more in the number than the size of the orders, the aggregate is more satisfying than it has been before this year. It cannot be said that the improvement yet has filtered through to price changes, and it is also a fact that all products do not share alike in the buying. The lighter materials, such as tin plate, sheets, and tubular goods, are doing much better, relatively, than are the heavier tonnage products. As far as prices are concerned, buyers who have fairly substantial tonnages to place have a dominating voice in the terms. At that, however, buyers are having some difficulty in obtaining concessions from 1.40c. on plates, shapes and bars, and the larger producers of sheets continue to refuse business in black and galvanized stock at less than 3c. and 4c., respectively.

The market in wire products is unsettled. Persistent and widely circulated reports of an early reduction of \$5 per ton have seriously restricted orders, as buyers are holding back until convinced that such action is not likely.

Business calling for extended delivery is entirely lacking; indeed, all of the business coming to manufacturers is for prompt shipment and represents only the immediate requirements of buyers. Liquidation has been so complete in practically all products that actual needs are increasing, and this accounts for the improvement in business during the past few weeks. Manufacturers of cold-finished steel bars and of nuts, bolts and rivets still are encountering some liquidating sales, but in all other lines consumers' and jobbers' stocks appear to be down to bare boards. The prices now prevailing seem to be the obstacle in the path of advance business in sheets, as buyers seem to have the idea that because the decline in prices has been relatively less in this line than in several others, current

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron Per Gross Ton	Feb. 14, 1922	Feb. 7, 1922	Jan. 17, 1922	Feb. 15, 1921
No. 2x, Philadelphia	\$21.34	\$21.34	\$21.34	\$30.09
No. 2, Valley furnace	18.75	19.00	19.50	28.00
No. 2, Southern, Cin'tit	20.00	20.00	20.50	32.00
No. 2, Birmingham, Ala.	15.50	15.50	16.00	27.50
No. 2 foundry, Chicago*	18.00	18.50	19.00	28.00
Basic, del'd, eastern Pa.	19.81	19.81	20.25	31.10
Basic, Valley furnace	17.75	17.75	18.25	27.00
Bessemer, Pittsburgh	21.46	21.16	21.46	28.96
Malleable, Chicago*	18.00	18.50	19.00	28.50
Malleable, Valley	19.00	19.00	19.50	28.00
Gray forge, Pittsburgh	20.71	20.96	20.96	28.96
L. S. charcoal, Chicago	30.50	30.50	31.50	38.50
Ferromanganese, seaboard	62.50	58.37	60.00	90.00

Rails, Billets, etc. Per Gross Ton	Feb. 14, 1922	Feb. 7, 1922	Jan. 17, 1922	Feb. 15, 1921
O.-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh	28.00	24.00	28.00	43.50
O.-h. billets, Pittsburgh	28.00	24.00	28.00	38.50
O.-h. sheet bars, P'gh	29.00	29.00	29.00	42.00
Forging billets, base, P'gh	32.00	32.00	32.00	43.50
O.-h. billets, Phila.	33.74	35.74	33.74	49.24
Wire rods, Pittsburgh	36.00	36.00	36.00	52.00
Skep, gr. steel, P'gh, lb.	1.50	1.50	1.50	2.45
Light rails at mill	1.50	1.50	1.50	2.45

Finished Iron and Steel

Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.76	1.81	1.81	2.70
Iron bars, Chicago	1.60	1.60	1.60	2.63
Steel bars, Pittsburgh	1.40	1.40	1.50	2.10
Steel bars, Chicago	1.55	1.55	1.60	2.48
Steel bars, New York	1.78	1.78	1.88	2.48
Tank plates, Pittsburgh	1.40	1.40	1.50	2.25
Tank plates, Chicago	1.55	1.55	1.60	2.63
Tank plates, New York	1.78	1.78	1.83	2.63
Beams, Pittsburgh	1.40	1.40	1.50	2.20
Beams, Chicago	1.55	1.55	1.60	2.58
Beams, New York	1.78	1.78	1.88	2.58
Steel hoops, Pittsburgh	1.90	1.90	2.00	2.80

*The average switching charge for delivery to foundries in the Chicago district is 70c per ton.

†Silicon, 1.75 to 2.25 ‡Sincron 2.25 to 2.75

Sheets, Nails and Wire	Feb. 14, 1922	Feb. 7, 1922	Jan. 17, 1922	Feb. 15, 1921
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.20
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.50
Sheets, blue an'd, 9 & 10	2.25	2.25	2.25	3.20
Wire nails, Pittsburgh	2.10	2.40	2.50	3.25
Plain wire, Pittsburgh	2.15	2.25	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.15	3.15	3.85
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$7.00

Old Material Per Gross Ton

Carwheels, Chicago	\$15.00	\$15.00	\$18.50	\$20.50
Carwheels, Philadelphia	16.50	16.50	16.50	23.00
Heavy steel scrap, P'gh	13.50	13.50	14.50	14.00
Heavy steel scrap, Phila.	12.00	12.00	11.50	14.50
Heavy steel scrap, Ch'go	11.25	11.25	11.50	15.00
No. 1 cast, Pittsburgh	16.00	16.00	16.50	23.00
No. 1 cast, Philadelphia	16.50	16.50	16.50	23.00
No. 1 cast Ch'go (net ton)	13.00	13.00	13.00	18.00
No. 1 RR. wrot, Phila.	14.00	14.50	14.50	20.00
No. 1 RR. wrot, Ch'go (net)	10.50	10.50	10.50	13.50

Coke, Connellsville Per Net Ton at Oven

Furnace coke, prompt	\$2.00	\$2.75	\$2.75	\$4.50
Foundry coke, prompt	4.00	3.75	3.75	5.50

Metals

Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.50	13.87½	13.50
Electrolytic copper, retn'y	13.00	13.25	13.62½	13.00
Zinc, St. Louis	4.50	4.50	4.77½	5.00
Zinc, New York	4.55	4.85	5.12½	5.35
Lead, St. Louis	4.30	4.40	4.40	4.35
Lead, New York	4.70	4.70	4.70	4.70
Tin (Strait), N. Y.	30.75	32.00	32.00	32.50
Antimony (Asian), N. Y.	4.40	4.40	4.45	5.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Feb. 14, 1922, Finished Steel, 2.005c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Feb. 7, 1922	2.019c.
Jan. 17, 1922	2.062c.
Feb. 15, 1921	2.871c.
10-year pre-war average	1.689c.

Composite Price, Feb. 14, 1922, Pig Iron, \$18.02 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Feb. 7, 1922	\$18.10
Jan. 17, 1922	18.52
Feb. 15, 1921	26.76
10-year pre-war average	15.72

prices cannot be maintained. As a general proposition, however, the lack of forward buying is ascribable to the belief that if there is not a horizontal reduction in freight rates, at least there will be a cut in the rates on iron and steel, and buyers consequently are limiting their purchases with an idea of avoiding stocks "loaded" with present freight charges.

Plant operations reflect the increase in business. Tin plate mills are even more fully engaged this week than they were last week, independents in this and nearby districts, including the Wheeling Steel Corporation, which is making an effort to operate its Yorkville, Ohio, works on an "open shop" basis, averaging close to 90 per cent of capacity. The American Sheet & Tin Plate Co., taking sheet and tin plate mills together, is running about two-thirds of capacity. There is also a high rate of operation of pipe plants, while sheet and wire mills are making a relatively good showing. The leading independent in this district has more than 50 per cent of its steel works capacity engaged and the average of the Carnegie Steel Co. also

exceeds 50 per cent. There has been some gain in bar mill operations, but plate and structural mills still are rather poorly engaged.

The pig iron market reflects a firmer attitude upon the part of producers of basic grade, all of whom quoted \$18, Valley furnace, against a recent inquiry for a round tonnage. Foundry iron, however, is slightly weaker, as some furnace interests outside the Valley district have been coming into Pittsburgh with tonnages. There is a firmer market in coke, due to a better demand for coal, inspired by the possibility of a miner's strike. The scrap market still is inactive and rather easy.

Pig Iron.—It has been another dull week in this market as far as sales are concerned. The only important inquiry which recently has come out is from the Allegheny Steel Co., which is seeking 1000 tons of basic and 300 tons of Bessemer iron for immediate delivery. It is probable that this business will be closed this week. Common expectation is that some more resale basic iron will be bought, as a railroad equipment

company still is liquidating its stock, and is understood to have made a quotation of \$17.75, Valley furnace, on the tonnage sought. Producers having any of this grade for sale, however, no longer are willing to consider less than \$18. We note a sale of a fair-sized tonnage of No. 2X foundry iron at \$19.25, Valley furnace, and subtracting the usual differential of 50c. per ton, this would mean \$18.75 for plain No. 2. Carload lots of the latter grade still command \$19, Valley furnace, and the same price is asked for No. 3 and forge iron.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$17.75
Bessemer	19.50
Gray forge	\$18.75 to 19.00
No. 2 foundry	18.75 to 19.00
No. 3 foundry	18.75 to 19.00
Malleable	19.00

Ferrolloys. Domestic makers of ferromanganese have followed the advance recently announced by English makers to \$62.50 c.i.f. Atlantic seaboard, for 80 per cent material, and this price probably will be adopted by the Steel Corporation subsidiary making this alloy. So far agents of German makers have had no advices with regard to prices, but the impression prevails that German material also will be advanced. The new quotation as yet is largely on asking price, as the demand is moderate in this district and there have been no important sales recently. The advance in ferromanganese, coupled with the fact that existing supplies are exceedingly small, is reflected in a stiffer market in spiegeleisen. A western Pennsylvania manufacturer several weeks ago disposed of all stocks laying on the furnace yard and stocks of an Eastern producer now are reported to consist of only about 200 tons of 16 to 19 per cent material. The former is out of the market and the latter has put a price of \$30 furnace on the unsold tonnage. A Valley steel maker is seeking 100 tons of 16 to 19 per cent spiegeleisen. Fifty per cent ferrosilicon is inactive with makers asking \$60 furnace, freight allowed, for 50 per cent, but no important sales are being made at that price.

We quote 78 to 82 per cent ferromanganese, \$62.50 c.i.f. Atlantic seaboard for domestic and English and \$58.37 for German. Average 20 per cent spiegeleisen, nominal, \$30 to \$35 delivered Pittsburgh or Valley; 60 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted Feb. Jackson and New Straitsville, Ohio furnaces as follows: 10 per cent, \$36.50; 11 per cent, \$39.80; 12 per cent, \$43.10; 13 per cent, \$47.10; 14 per cent, \$52.10; silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$25.50; 9 per cent, \$29.50; 10 per cent, \$31.50; 11 per cent, \$41; 12 per cent, \$36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$1.06 per gross ton.

Billets, Sheet Bars and Slabs. The inquiry for 1500 to 2000 tons of billets from a Pittsburgh district maker of strip steel, referred to a week ago, has been closed with a Valley producer. It is understood that the price was \$28 Youngstown for 4-in. and larger billets and \$29 for the smaller sizes. Since the freight to point of consumption is greater from Youngstown than from Pittsburgh, it is believed there was equalization of freight on this transaction, which also indicates a re-establishment of the pre-war differential of \$1 per ton between large and small billets. There has been no further business in sheet bars since the recent sale of 1000 tons at \$29 Pittsburgh. Slabs are inactive and prices nominal.

We quote 1 1/2 x 1/2 in. soft bottom and open-hearth billets at \$28 to \$29; 1 1/2 x 1/2 in. billets, 2 1/2 to \$30; Bessemer and open-hearth sheet bars, \$29 to \$30; slabs, \$29 to \$30; forging billets, ordinary cuttings, \$23 to \$24; Feb. Youngstown or Pittsburgh mills.

Wire Rods. The best demand coming to local makers is for export, Japanese export houses being especially prominent. Domestic demands still are few and for small tonnages. On export business, the market is not quotable above \$35 for the base size of soft rods, but such domestic business as is doing is at \$36 to \$37. Prices are given on page 505.

Steel Skelp. Makers still are holding to 1.50c. for pipe skelp, but demands are so few and small that this price must be regarded as largely untested. Since skelp usually sells at the same price as plates, and the latter have gone as low as 1.40c., it is probable that a sizable tonnage of skelp could be placed at that price.

Wire Products. A good many inquiries are coming out for nails and other wire products from jobbers, pre-

paratory to the Spring demand, but only a small percentage of them is going upon makers' books as orders because there is so much uncertainty about prices. A widely circulated report that at an early date nails would be reduced to \$2.25 base per keg, Pittsburgh, with a corresponding reduction in other products, has caused buyers to withhold orders in expectation of some sort of a move in that direction. Meanwhile, makers in this district are trying to maintain the market at \$2.50 base, per keg, for nails and \$2.25 base per 100-lb. for plain wire, but large buyers are getting concessions of \$2 per ton from these prices, and the smaller distributors are trying to buy at the same prices. We make a range of \$2 per ton in the quotations, the lower prices being to large buyers. Export business in nails and wire, including both plain and barbed, notably to Japan, is relatively good.

We quote wire nails at \$2.10 to \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.15 to \$2.25 base per 100 lb., Pittsburgh.

Steel Rails. The market for light rails is inactive and inclined toward weakness. Occasional export inquiries, some of them running as much as 300 and 400 tons, are coming out, but most of the domestic demands are for single carloads. The market on these sections, rolled for new steel, still is quoted at 1.50c. base, but more business is being lost than obtained at that price. Light rails rolled from old standard rails, readily are obtainable at 1.45c., and it is believed that a sizable lot of new steel rails could be placed at the same figure.

We quote 2 1/2 to 4 1/2-in. sections, rolled from new steel, 1.50c. base, rolled from old rails, 1.45c. base, standard rails, \$10 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars. At 1.40c., Pittsburgh, soft steel bars seem to have touched a level which appeals to buyers, and there is not only more business and heavier operations of the mills than before in some time, but a marked tendency on the part of makers to regard that price as an irreducible minimum and not to go that low on ordinary orders. Both consumers and jobbers are freer buyers, although not anticipating their requirements very far ahead. There is a very fair demand from some of the makers of popular priced motor cars and recent export inquiries have included some bars, along with plates and shapes. Not much reinforcing bar business is in sight in this district. Iron bars still are slow of sale.

We quote steel bars rolled from billets at 1.40c. to 1.50c.; reinforcing bars rolled from billets, 1.40c. to 1.50c. base; reinforcing bars rolled from old rails, 1.35c. to 1.40c.; rolled iron bars, 2 1/2 to 7 1/2 in. carloads, Feb. mill, Pittsburgh.

Structural Material. The report about this district still is one of fairly numerous inquiries and much activity in the engineering department of the fabricating companies, but only a few awards, and those mostly of tonnages of less than 100. The Mellon-Stuart Co. is reported to have been given the general contract for a new four-story building for the Mellon National Bank, Pittsburgh, but no action has been taken in connection with letting the 1700 tons of steel which will be required. A seven-story building for the Pittsburgh Y. M. C. A., which has been dormant for several months, again is showing life, and a formal inquiry probably will go out shortly. The Pittsburgh-Des Moines Steel Co. will fabricate more than 500 tons of penstock work for a New York State Stock Farm. Plain material business is better in the prospective than in the actual, because mills in this district are not benefiting much by the big jobs which are being placed in other cities. Some export demands for small shapes are filtering in. The going market price on structural beams is 1.40c., Pittsburgh, but this price is not acceptable to the mill except on fairly large tonnages. Prices are given on page 505.

Sheets. Possibly business is a little better on the whole than it was recently, but the improvement is seen in the number rather than the size of the orders, and there is no tangible evidence of any departure on the part of buyers from their recent policy of merely taking on their actual requirements. In view of the fact that all stock ordered is wanted immediately, it is evident that buyers' stocks are low, but the expectation that the

weakness in other lines of finished steel will eventually force price concessions in sheets is making buyers cautious about placing their future needs. There continues to be remarkably close adherence to 3c. base for black sheets and 4c. base for galvanized on new rollings, but in the heavier gages of blue annealed the plate base is as frequently quoted as the blue annealed base. Concessions on black and galvanized sheets usually refer to stock material or sheets that have been thrown back upon makers' hands because of some defect. Prices are given on page 505.

We quote sheared plates, $\frac{1}{4}$ in. and heavier, tank quality, at 1.50c. f.o.b. Pittsburgh.

Tin Plate.—Mills in this and nearby districts are enjoying a very high rate of operation, but the explanation is found in specifications against old contracts, rather than in new business. Two of the independent plants in this district are running full while three others are running 90 per cent or higher. The leading interest is not doing quite so well as the independents in the matter of operations, but it succeeded in moving so much tonnage during November, December and January that this is an altogether natural condition. Prices do not change much, due to the fact that so little new business is coming out. Export demands are lighter than they were recently.

We quote standard production coke tin plate \$1.75 per base box f.o.b. Pittsburgh for carload lots.

Cold Finished Steel Bars and Shafting.—Makers in this district are experiencing a somewhat better inquiry, but the improvement is in the number rather than in the tonnages involved. Buyers, quite generally, are confining purchases to small lots to round out existing stocks. The common quotation is 2c. base Pittsburgh, but it is frequently necessary for makers to go to 1.90c. base and occasionally even lower, to secure orders in competition with liquidating sales. Ground shafting holds at 2.25c. base, f. o. b. mill for carload lots.

Hoops and Bands.—There is no particular change in the situation either as regards demand or prices. Buyers are extremely cautious and are doing considerable shopping before placing orders. Prices are not very well established. On bands there is a range of from 1.75c. to 1.90c. and on hoops from 1.90c. to 2c., but the higher prices are the exception.

Nuts and Bolts.—No material increase in inquiries or orders can be chronicled, as buyers are merely covering their barest requirements. Prices still lean in buyers' favor. Nothing yet has been reported in connection with the inquiry of the New York Central Lines for 5000 to 8000 kegs of track bolts, bids against which went in Feb. 8. There is much interest in this business and also in the bolt and nut requirements for the new vehicular tunnel, New York. Discounts are given on page 505.

Plates.—Demands upon mills in this and nearby districts still are few and small and there is poorer engagement of capacity than of any other class of finishing mills. Tank builders are fairly busy, but seem to be covered against their orders and railroad equipment companies in this territory are not faring nearly as well as those in other centers, notably in the Chicago district. There is no disposition by mills here or in the Valleys to go below 1.40c. and more is sought on the general run of inquiries, which are for small lots. Stocks everywhere are low, but there being no question as to deliveries, buyers are inclined to order supplies as they are wanted.

Iron and Steel Pipe.—There is a steady, although not particularly active, demand for merchant pipe in both steel and wrought iron, as spring building activities in most parts of the country promise well and jobbers want to be prepared for the demands involved. Some improvement also is noted in the demand for oil country goods, despite the fact that oil prices have declined on some grades in the Western fields. Line pipe inquiries are fairly numerous. The Hope Engineering & Supply Co., Mt. Vernon, Ohio, has asked for prices on 98 miles of 12-in. pipe for a gas line out of the Monroe, La., field. There is also an inquiry for 100 miles of 6-in. pipe. Export demand for oil well pipe is reported to be better, and especially from Mexico and South America.

There is just fair observance of the card discounts, which are given on page 505.

Boiler Tubes.—Expectations of a fairly good spring demand are causing somewhat larger purchases by jobbers. There is still some price cutting in steel tubes, both lap welded and seamless, but prices of iron tubes are fairly well maintained. Discounts are given on page 505.

Hot-Rolled and Cold-Rolled Strips.—There is a fairly good business in both kinds of material, but it is for the replenishment rather than the building up of stocks. On cold-rolled strips makers are holding rather firmly to 3.50c., base, Pittsburgh, but there is pretty frequent departure from the regular or official quotation of 2c., base, on hot-rolled. Makers, however, are not going to recent minimums except to secure orders which are attractive from a rolling standpoint.

Coke and Coal.—The market is considerably firmer on spot tonnages of coke than it was recently, this development being directly due to a better market for coal as a result of purchases in anticipation of a strike of union coal miners on April 1. While coal prices have not advanced, there is a better market and this has induced some producers to put out coke ovens and ship coal. Disappearance of coke offerings by those without regular consuming connections has left the market rather bare, and lately fuel suitable for blast furnaces has not been available at less than \$2.90 per net ton, oven, while some business has been done at \$3. Spot foundry coke also is less freely offered and \$4 per net ton oven has become the minimum price. Blowing out of the furnaces of the Sharon Steel Hoop Co., Lowellville, Ohio, has thrown back upon the market about 11,000 tons of coke a month, but this has had no effect upon the market, as the bulk of the tonnage has been diverted to other consumers. The Hanna Furnace Co., which will blow in a furnace at Dover, Ohio, next week, is negotiating for 14,000 tons a month and is reported to have covered a portion of these requirements.

Old Material.—The market is no more active nor any firmer than it has been despite the fact that the past week or ten days has seen some increase in steel works activities among plants in this and nearby districts. Evidently the steel companies have accumulated fair sized stocks because they are still very sparing buyers of scrap. Even those charging light material have been less eager for supplies in the past week than they had been previously. Two important consumers of machine shop turnings are endeavoring to obtain supplies at \$9.50, but are not getting much material for the reason that dealers are paying that much and in some instances higher against contracts they took at higher prices. Offerings of this grade are moderate and \$10 is probably as low as round lots could be bought. The only demand for heavy melting steel is from dealers who have contracts to cover and they are unwilling to go above \$14. There are occasional sales a little above this price for single carloads for quick shipment.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Tolland, Brackenridge, Monessen	
Midland and Pittsburgh	\$12.50 to \$14.00
No. 1 case, cupola size	16.00 to 16.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Huntington, W. Va., and Franklin, Pa.	14.00 to 15.50
Compressed sheet steel	11.75 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Low phosphorus standard bloom and billet ends	17.00 to 17.50
Low phosphorus plates and other grades	16.50 to 17.00
Railroad malleable	12.50 to 13.00
Iron car axles	23.00 to 24.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.50 to 15.00
Roller steel wheels	14.00 to 14.50
Machine shop turnings	9.50 to 10.00
Sheet bar crop ends	13.50 to 14.00
Heavy steel axle turnings	11.00 to 11.50
Short shovelling turnings	11.00 to 11.50
Heavy breakable cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Cast iron borings	11.00 to 11.50
No. 1 railroad wrought	11.50 to 12.00

Chicago

CHICAGO, Feb. 14.

Mill bookings continue to show a gradual but steady increase, one important local producer reporting the best week's sales for a year. While prices on the heavier rolled products are not any too steady, there is a growing disposition on the part of consumers to buy at present levels. The uninterrupted succession of losses shown in the quarterly reports of large steel producers has discouraged the belief that prices can go much lower. Possible freight rate reductions which were taken into consideration by purchasing agents earlier in the year now appear more remote and by some observers are regarded as already discounted by the market. That these or other considerations have removed much of the caution of the trade is evident from the increasing number of orders placed by a great diversity of buyers, being received particularly from the railroads. So far as tonnage buying is concerned, this continues to be traceable directly or indirectly to the carriers. Heavy specifications are being received from car builders and there is still much railroad car business in sight. From the railroads themselves are coming generous orders for track supplies, and while rail buying is not brisk, a few good-sized inquiries are pending. The Inland Steel Co. expects to start its rail mill during the week commencing Feb. 28.

Increased bookings have been reflected in better mill operations. The Illinois Steel Co. has started another blast furnace at Gary, making six active at that plant, four at South Works and one at Joliet, or a total of 11. At the same time, it has increased its steel output to 50 per cent of capacity. The Inland Steel Co. is on practically the same basis as last week.

Pig Iron.—The leading Northern merchant to-day advanced its prices to \$20 base furnace, for foundry, malleable and basic. This action was followed by a steel works furnace which is selling malleable, while the Inland Steel Co., which is employing one furnace on merchant iron, is booked ahead through March. Up until the time the new prices were announced the local market was exceedingly weak. Sales were made at prices ranging from \$18 to \$18.50 base, furnace, with the tendency toward the general establishment of the lower base. As yet the new prices are untested, but it is evident that they constitute an effort on the part of producers to stem a decline which was steadily increasing the red figures on their books. One effect of the advance will be to make it easier for Southern iron to enter this territory. Until recently the delivered price of the Southern product has been so high that any extensive sales were out of the question. In general the market has been somewhat more active during the past week. Shipments from the furnaces represented by the leading local merchant continue to increase, although some iron is still being piled. On the whole, buyers have been more receptive to the efforts of sellers than for some time. Prominent among recent sales may be mentioned 1000 tons of foundry for delivery in Wisconsin over the next three months and 500 tons of malleable for Indiana shipment. Charcoal, low phosphorous and silvery are quiet. Jackson County producers have announced a \$2 reduction on all grades of silvery and Bessemer ferrosilicon.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c per ton. Other prices are for iron delivered at consumers' yards, or when so indicated f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
all 150 delivered at Chicago	\$30.50 to \$31.50
Northern coke, No. 1, all 2 25 to 2.75	18.50 to 19.00
Northern coke, foundry, No. 2, all	
1.75 to 2.25	18.00 to 18.50
Northern high phosph.	18.00 to 18.50
Southern foundry, all 1 75 to 2.25	21.67
Malleable, not over 2 75 all	18.00 to 18.50
Basic	18.00 to 18.50
Low phosph., Valley furnace, all 1 to 2	
per cent copper free	29.50
Silvery, all 5 per cent	32.82

Railroad Equipment.—The Burlington has not yet placed the 500 automobile cars remaining on its inquiry, but is expected to do so this week. The Great Northern will probably close on 500 refrigerator cars in the next few days and on the remaining 2600 freight cars on its inquiry next week. Action on its inquiry for

20 passenger coaches has been postponed indefinitely. The St. Paul is in the market for 1000 drop bottom stock cars in addition to the 1000 box reported last week. Additional inquiry reported from this road will probably bring the total up to 4000 cars. The Northern Pacific is inquiring for 500 refrigerator cars, while the Union Pacific wants 18 observation cars and 70 caboose cars. In the East the Philadelphia & Reading has distributed orders for 2500 hopper cars.

Ferroalloys.—Ferromanganese has been advanced to \$62.50, tidewater, or \$70.90 delivered Chicago. There was considerable business closed on the eve of the advance, one local broker having taken orders for 600 tons.

We quote 75 to 82 per cent ferromanganese \$70.90 delivered, 50 per cent ferrosilicon \$56 to \$57.50, delivered; spiegelstein 14 to 22 per cent, \$36.50 to \$37, delivered.

Bars.—Mills report a gradual increase in bookings as well as a growing diversification in demand for soft steel bars. Miscellaneous manufacturers, including machinery builders and farm implement makers, are commencing to buy in a small way and at the same time orders are being cautiously placed by jobbers. The bulk of current business, however, consists of specifications from car builders and orders for reinforcing steel. One local merchant mill yesterday commenced rolling an order for 4000 tons of deformed bars. A round tonnage of reinforcing has been placed recently for road building purposes, and numerous reinforced concrete building projects are being figured on. The St. Paul, Minnesota, Water Department took bids yesterday on 500 tons for a pumping station. Prices are still weak, with the general market at substantially the same level as last week. Demand for bar iron is light and prices are unchanged. Hard steel bar demand is sufficient to enable local mills to operate single turn. Tonnage booked is largely for bedstead and steel post manufacture and for reinforcing purposes. The ruling market is 1.50c. mill, although attractive tonnages have brought out concessions. A local mill booked 1200 tons for the American Fore building, Chicago, at 1.45c.

Mill prices are Mild steel bars, 1.57c to 1.60c (Chicago), common bar iron 1.60c, (Chicago), rail carbon, 1.50c, mill or Chicago.

Jobbers quote 2.30c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and sheeting is 1.40c. for rounds and 3.90c. for flats squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Hoops and bands, 3.13c.

Wire Products.—While jobbers are buying a little more freely, they are not yet laying in stocks in the quantities they usually do at this time of the year. The price situation is weaker and large orders for wire nails are being placed at \$2.40, Pittsburgh. Reports that the leading interest will announce a new price of \$2.25 cannot be confirmed here. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 505.

We quote warehouse prices f.o.b. Chicago. No. 9 and heavier black annealed wire \$3.13 per 100 lb., No. 9 and heavier bright basic wire, \$3.28 per 100 lb., common wire nails, \$3.25 per 100 lb., cement coated nails \$2.65 per keg.

Sheets.—Further reports of slight concessions on galvanized and black are circulating, but no general weakness is to be noted, and prices appear to remain fairly firm at the quotations published below. Domestic demand is slightly better, but still light. Export business is good.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 1c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote Chicago delivery out of stock, No. 10 blue annealed, 3.35c., No. 28 black 4.15c., No. 28 galvanized, 5.15c.

Steel Castings.—Orders for the steel castings in the Burlington cars have not yet been placed. The bolsters, side-frames and couplers will be placed by the railroad, while the miscellaneous castings will be bought by the car builders. Covered in each case by protections granted in December, the placing of these orders will not develop changes in prices which might be warranted by present market conditions. On new business the prices and discounts on pages 348 to 350 of THE IRON AGE of Feb. 2 are regarded as the market.

Plates.—Specifications from car builders continue to account for the bulk of the bookings of local plate

mill, but orders from miscellaneous sources are notably more numerous, although individually small. On the other hand, demand from oil storage tank fabricators has fallen off markedly. The price situation is still weak, steel for cars being bought at \$2 to \$3 below the general market.

The ruling mill quotations range from 1 c to 160c. Chicago Jobbers quote 263c for plates out of stock.

Structural Material.—Fabricating awards have fallen off during the past week, but a large amount of work is pending. The Chicago sales office of one important fabricator reports that it has submitted bids on 40,000 tons since Jan. 1, as compared with a maximum of 110,000 tons for any previous complete year. One of the largest jobs on which bids have recently been taken is the Bankers' Life building, Des Moines, Iowa, involving 1700 tons. Plain material prices are on about the same basis as described last week. Recent fabricating awards include:

Chicago Burlington & Quincy Railroad, one 55 foot and two 103 foot through truss spans, 134 tons to Votkins Steel Works and A. Bolters Sons.

Bridge over Saint Croix River, Prescott, Wis., 22 tons to Milwaukee Bridge Co.

Bridge over Missouri River, Boonville, Mo., 1527 tons to Mount Vernon Bridge Co.

The mill quotation on plain material ranges from 177c to 160c. Chicago Jobbers quote 263c for plain material out of warehouse.

Bolts and Nuts.—The market remains decidedly weak, but the prices and discounts published last week are still representative. The automobile builders and the railroads are the principal buyers. The Ford Motor Co. has closed for 10,000,000 nuts at sharp concessions in prices. Jobbers are buying very cautiously.

Jobbers quote structural rivets 313c. Boiler rivets 33c. Machine bolts up to 3/4 x 4 in. 60 and 10 per cent off larger sizes. 10 to 10 off carriage bolts up to 3/4 x 8 in. 60 and 10 off larger sizes. 5 and 10 off hot pressed nut square and hexagon tapered 5/7 off blank nuts. 54 off coach or lag screws. 60 off joints square heads. 65 and per cent off. Quantity extras are unchanged.

Old Material. Sentiment among dealers has improved, but in the absence of any consumptive buying of importance the price situation remains largely unchanged. There are indications, however, pointing to increased speculative buying and it is possible that a strong dealers' market may develop. The only notable purchases by users recently have been for cast scrap. Railroad offerings include The Great Northern, 6000 tons, the Rock Island, 3000 tons, the Northern Pacific, 3000 tons, the Santa Fe 2500 tons, the Wabash, 1000 tons. The quotation on No. 1 busheling published last week, was in error. It should have been \$8.25 to \$8.75 per net ton.

We quote delivery in consumers yards, Chicago and vicinity, all freight and transfer charges paid as follows:

	Per Gross Ton
Iron rails	\$16.00 to \$17.50
Relaying rails	0.00 to 2.00
Cast iron car wheels	1.00 to 1.50
Roller or forged steel car wheels	13.00 to 13.50
Steel rails re-rolling	12.00 to 12.50
Steel rails less than 1 ft	12.00 to 1.00
Heavy melting steel	11.25 to 11.75
Wedge switches and guards cut apart	11.25 to 11.75
Shoveling steel	10.75 to 11.25
Low phosphorus heavy melting steel	13.00 to 14.00
Drop forged flashings	7.50 to 8.00
Hydraulic compressed steel	7.00 to 8.00
Axle turnings	8.50 to 9.00

	Per Net Ton
Iron angles and splice bars	11.00 to 11.50
Steel angle bars	10.00 to 11.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.00 to 20.00
Steel car axles	12.00 to 13.00
No. 1 busheling	8.25 to 8.75
No. 2 busheling	6.00 to 6.50
Cut forges	10.00 to 10.50
Pipes and flues	6.00 to 7.00
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	10.75 to 11.25
Coil springs	12.50 to 13.00
No. 1 machinery cast	13.00 to 13.50
No. 1 railroad cast	12.00 to 13.00
Low phosphorus punchings	11.00 to 11.50
Locomotive tires smooth	4.00 to 10.00
Machine shop turnings	4.50 to 5.00
Cast borings	6.00 to 6.50
Stove plate	1.00 to 1.50
Grate bars	10.50 to 11.00
Brake shoes	10.00 to 11.00
Railroad malleable	11.00 to 11.75
Agricultural malleable	11.25 to 11.75

Rails and Track Supplies.—The Chesapeake and Ohio is about to place 18,000 tons of rails, a part of which at least is expected to go to local mills. The Minneapolis & St. Louis and the Soo Line recently

ordered 3000 tons and 2000 tons respectively from a Chicago producer. Demand for track materials is more active than for rails. The Great Northern and the Soo Line placed orders in Chicago for 6000 tons and 1000 tons of tie plates respectively. The Louisville & Nashville placed 3600 tons with the Tennessee company and the Michigan Central is in the market for 5000 tons. Demand for light rails is small, with billet steel rails available at from 155c to 160c mill, and re-rolled rails for less.

Standard Bessemer and open hearth mild \$40 light rails rolled from new steel 1 1/2 to 1 1/4 inch makers mills. Standard railroad spikes 10 cent bush truck bolts with square nuts 10 cent bush truck tie plates steel and iron 17 cent bush mill angle 1 1/2 to 1 1/4 inch mill.

Cast-Iron Pipe.—The Peoples Gas Co., Chicago, is in the market for 15,000 tons of gas pipe and the Milwaukee Gas Co. for 4000 tons. While few new inquiries for water pipe have appeared within the past week, there is much municipal work in a formative stage. Brillion, Wis., has let 375 tons to the American Cast Iron Pipe Co. The same producer is low bidder on 800 tons for Minneapolis. Fort Wayne, Ind., will take bids, Feb. 21, on 190 tons.

We quote delivery in consumers yards as follows: Water pipe 1 in. \$4.00 to \$4.50 1 1/2 in. \$4.50 to \$5.00 2 in. \$5.00 to \$5.50 2 1/2 in. \$5.50 to \$6.00 3 in. \$6.00 to \$6.50 3 1/2 in. \$6.50 to \$7.00 4 in. \$7.00 to \$7.50 4 1/2 in. \$7.50 to \$8.00 5 in. \$8.00 to \$8.50 5 1/2 in. \$8.50 to \$9.00 6 in. \$9.00 to \$9.50 6 1/2 in. \$9.50 to \$10.00 7 in. \$10.00 to \$10.50 7 1/2 in. \$10.50 to \$11.00 8 in. \$11.00 to \$11.50 8 1/2 in. \$11.50 to \$12.00 9 in. \$12.00 to \$12.50 9 1/2 in. \$12.50 to \$13.00 10 in. \$13.00 to \$13.50 10 1/2 in. \$13.50 to \$14.00 11 in. \$14.00 to \$14.50 11 1/2 in. \$14.50 to \$15.00 12 in. \$15.00 to \$15.50 12 1/2 in. \$15.50 to \$16.00 13 in. \$16.00 to \$16.50 13 1/2 in. \$16.50 to \$17.00 14 in. \$17.00 to \$17.50 14 1/2 in. \$17.50 to \$18.00 15 in. \$18.00 to \$18.50 15 1/2 in. \$18.50 to \$19.00 16 in. \$19.00 to \$19.50 16 1/2 in. \$19.50 to \$20.00 17 in. \$20.00 to \$20.50 17 1/2 in. \$20.50 to \$21.00 18 in. \$21.00 to \$21.50 18 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Philadelphia

PHILADELPHIA, Feb. 14.

The local iron and steel market continues without definite trend. In some lines there appears to be spotty improvement, but on the whole there has not been much change for the better. Prices are weak, almost every commodity except black and galvanized sheets being sold at concessions, and in sheets there is not enough demand of importance to bring out sharp competition.

Pig iron producers have been attempting to hold No. 2 plain at \$20, furnace, and No. 2X at \$20.50, but have not been successful in all instances, especially in territory where the competition of \$18 Buffalo iron has to be met. Concessions on foundry pig iron, however, are infrequent except where a furnace finds it necessary to absorb part of the freight rate in competition with producers having a freight rate advantage.

Pig Iron.—Inquiry for pig iron has dropped off. The local market has been exceedingly quiet in the past week. In the immediate Philadelphia territory there is little interest in foundry iron and inquiries and orders mostly range from a carload to 200 or 300 tons. Two lots of 1000 tons each were sold to pipe makers. One lot of 1000 tons was gray forge iron, which was sold at \$18.50, furnace. Producers of foundry iron are attempting to hold prices, but there are some concessions from the usual quotations of \$20 for No. 2 plain and \$20.50 for No. 2X. Such concessions are usually granted only when it is necessary for the furnace to absorb a part of a freight rate disadvantage in competing with \$18 Buffalo iron in New England and other territory lying between eastern Pennsylvania and Buffalo. Some eastern Pennsylvania producers have gone to \$19.50 for No. 2 plain and to \$20 for No. 2X. We note a sale of 200 tons of malleable iron at \$22.50, delivered. Buffalo malleable costs \$23.96, delivered in this district. Two or three inquiries for standard low phosphorus iron aggregate a few hundred tons, and sales have been made in the past week at \$30, furnace. There is no inquiry for basic iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 81 cents to \$1.01 per gross ton.

East. Pa. No. 2 plain 1 7/8 to 2 3/4 in.	\$20.81 to \$21.26
East. Pa. No. 2X " 2 1/2 to 2 3/4 in.	21.31 to 21.76
Virginia No. 2 plain 1 7/8 to 2 3/4 in.	22.24 to 22.74
Virginia No. 2X " 2 1/2 to 2 3/4 in.	22.74 to 23.24
Basic delivery eastern Pa.	19.84
Gray forge	20.50 to 21.50
Malleable	22.50 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferrolloys.—British producers of ferromanganese have advanced prices for American shipment to \$62.50, Atlantic seaboard. The reason given is the higher exchange value for the pound sterling. Domestic producers have also advanced their prices to the same figure. An inquiry for 2000 tons of spiegeleisen comes from Belgium, but exporters have little expectation of the business being placed here. Asking prices for spiegeleisen range from \$25 to \$26, furnace.

Billets.—There is little demand for semi-finished steel. Open-hearth re-rolling billets are obtainable at \$28 to \$29, Pittsburgh, and forging billets at \$32 to \$33, Pittsburgh.

Rails.—It is expected that the Chesapeake & Ohio Railroad will place orders shortly for 26,000 tons of heavy rails, of which 4000 tons is for the Hocking Valley Railroad.

Plates. A slight improvement in the volume of plate business is noted by some Eastern mills, but the situation as a whole is still far from healthy. Prices are weak, 1.40c., Pittsburgh, now being generally recognized as the market on attractive lots. Mills are able to obtain 1.45c. and 1.50c., Pittsburgh, only on small lots. An Eastern shipbuilding company, which is bidding on a riveted steel pipe project, is inquiring for 2500 tons of plates for the job. The Philadelphia & Reading Railroad was expected to place orders to-day for 800 tons of tank steel for car repairs. The same road has placed orders for 2000 freight cars and 50 steel passenger coaches, requiring about 25,000 tons of steel. The

passenger cars will be built by the Harlan plant of the Bethlehem Steel Co. at Wilmington, Del., while the passenger cars were divided as follows: Standard Steel Car Co., 500; Pressed Steel Car Co., 500; American Car & Foundry Co., 500, and Cambria Steel Co., 500.

Structural Material.—As soon as a site for the proposed sesqui-centennial World's Fair, to be held in Philadelphia in 1926, shall have been selected, it is expected that two or three hotel projects, which have been informally discussed, will go ahead. Bids will be opened next week on the Philadelphia public library, which will require about 3000 tons of steel. Fabricators are figuring building projects on the basis of 1.40c., Pittsburgh, for plain material.

Bars.—Bar iron is now obtainable at 1.40c., Pittsburgh, from Eastern mills. Steel bars are to be had at the same figure. Business is limited to small orders, but a somewhat better demand for concrete reinforcing bars is expected as soon as spring building work gets under way.

Sheets.—While there is little demand for black and galvanized sheets and therefore little test of prices, it is noted that quotations of 3c. on black and 4c. on galvanized are holding more firmly than are prices on other steel products. Blue annealed sheets are firm at 2.25c., Pittsburgh, except that some plate mills are offering Nos. 10, 11 and 12 gages on the plate basis, with usual extras. The tin plate market appears to have settled to \$4.60 per 100 lb. base box, with occasional lots selling at \$4.50.

Strip Steel.—Quotations on hot rolled strip steel have gone as low as 1.75c., Pittsburgh, though some mills are asking all the way up to 2c. Cold-rolled strip steel is quoted at 3.50c., Pittsburgh, by most makers, but there are occasional deviations in the way of cancelling extras.

Warehouse Business.—A moderate improvement in the volume of buying out of stock is reported. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron flange, 1 1/2 x 1/2 in., 2.90c.; round edge steel flange, 3.70c.; tank steel plates, 3/4-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.92c.; blue annealed steel sheets, No. 10 gage, 3.00c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, 3/4-in., 4.60c.; 3/16 in., 4.75c.; 1/2-in., 4.90c.; spring steel, 1.10c.; round cold rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to 3/16 in., inclusive, 3.10c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; too steel, 4.50c.

Old Material.—There have been no developments of interest in the scrap market within the past week and prices are substantially unchanged. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$12.00 to \$12.50
Scrap iron	12.00 to 12.50
Steel rails, re-rolling	15.00 to 15.50
No. 1 low phos. heavy 0.04 and under	18.00 to 19.00
Cast iron car wheels	15.00 to 15.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge iron	10.00 to 10.50
Bundled sheets (for steel works)	9.00 to 10.00
No. 1 bushing	11.00 to 12.00
No. 2 bushing	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use)	9.50 to 10.00
Mixed borings and turnings (for blast furnace use)	9.50 to 10.00
Machine-shop turnings (for re-rolling mill and steel works use)	9.50 to 10.00
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and re-rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	12.50 to 13.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	17.00 to 18.50

The Electric Controller & Mfg. Co., Cleveland, has received an order for complete electric control equipment for the new plant of the International Nickel Co. at Huntington, W. Va. The order covers 46 pieces of equipment.

St. Louis

St. Louis, Feb. 14.

Pig Iron.—The employment of barge service in the movement of Southern pig iron at a saving of \$1.50 under the all rail rate is interesting to the melters in this district. The barge service will be effective tomorrow. The iron will be moved via the Tennessee River to Metropolis, Ill., thence by rail to St. Louis. Under this arrangement, iron will be delivered at St. Louis at \$19.44 or \$13.70, Birmingham. Shipment will be made from Sheffield, which has a differential of 80c. under the Birmingham freight rate. On the basis of \$16, Birmingham, iron shipped all rail from that point is delivered in St. Louis at \$21.74. With Northern iron at \$18.50, Chicago, plus \$2.80 freight, the St. Louis price is \$21.30, giving the Southern product shipped water and rail an advantage on the present market of \$1.86 a ton. The capacity of these barges is about 400 tons. The first purchaser in St. Louis of a barge load of pig iron for the new service was Bridge & Beach Mfg. Co., manufacturer of stoves. The biggest order of the week, if not for the year, of Northern iron was made by a local melter, being 2000 tons of foundry grade for shipment over March and April. The volume of orders for carloads was fairly large, and these invariably were for immediate shipment. The consumption of iron is a bit stronger, but most melters are content to buy only for their immediate needs. More stove foundries are starting up. The Belleville stove plants have adjusted the wage differences with their men, and they are expected to resume operations soon. An Illinois radiator concern is in the market for 500 tons of foundry iron for March shipment. A northern Illinois steam specialty company wants 200 tons. An Indiana engine boiler concern has an inquiry out for 500 to 1000 tons. Foundries specializing in railroad castings are hopeful that the proposed new plan of financing the lines will result in a better demand from that source.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, sd. 1.75 to 2.25	\$21.30
Northern malleable, sh. 1.75 to 2.25	21.30
Basic	21.30
Southern foundry, all rail, sd. 1.75 to 2.25	21.11
Southern foundry, sd. 1.75 to 2.25, rail and water	19.44

Finished Iron and Steel.—The demand for finished iron and steel products is rather light. Railroads centering here are not getting out any inquiries, and there is very little doing in structurals here, pending a readjustment of the wage scale. Jobbers report a little better demand, but they are not stocking up, and are depending upon the manufacturers to do that for them. A manager of sales stationed here has just returned from a trip to the jobbing centers of Tennessee, Louisiana and Arkansas, finding the jobbers buying only goods that they actually must have. They are not fearful of the market, but they feel that there is no necessity to carry large stocks so long as prompt shipments can be had from manufacturers. The awarding of the contract for the Jewish Hospital, Memphis, involving 300 tons of reinforcing bars, for which the James Alexander Construction Co. was the low bidder, has been held up for several weeks. The Kansas City, Clay County & St. Joseph Railway, Kansas City, has an inquiry out for 100 tons of 70-lb. steel rails, and the East St. Louis & Suburban Railway, East St. Louis, Ill., want 100 tons of the same weight rails. A manufacturer of engines bought 10 crankshafts, involving about 30 tons. The Union Pacific Railroad has issued notices of an indefinite postponement of the buying of 25 observation and 50 passenger cars or which they had asked prices.

For stock out of warehouse we quote: Soft steel bars, 2.62 1/2c. per lb.; iron bars, 2.62 1/2c.; structural shapes, 2.72 1/2c.; tank plates, 2.72 1/2c.; No. 10 blue annealed sheets, 3.47 1/2c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52 1/2 per 100 lb.; boiler rivets, \$3.62 1/2; tank rivets 7/16 in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-15 per cent; hot pressed nuts, square or hexagon blank, \$1; and tapped, \$3.75 off list.

Coke.—There is more buying of coke in this district, and the situation looks much better than it has. Con-

sumers are drawing more heavily on supplies contracted for, and generally more interest is being shown. For the present most of the business is confined to carload orders, and these are for immediate shipment. Between 1000 and 1500 tons of Granite City by-product water, gas and furnace coke were booked last week as well as 300 to 400 tons of foundry coke. A cause of increasing interest in coke is the talk of coal miners' strikes. The movement of domestic coke has been far more liberal because of colder weather.

Old Material.—The market for old material remains dull and listless, and there is very little trading of any description even among dealers. Consumers refrain from making any purchases even at what appears to be bargain prices and intimate that until their reserve stocks have been heavily depleted they will remain out of the market. Current railroad offerings include: Great Northern, 7500 tons; Northern Pacific, 2000 tons; Pullman Co., 1000 tons, and Kansas City Terminals 500 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	\$11.00 to \$14.50
Steel rails, rolling	10.50 to 11.00
Steel rails, less than 4 ft.	12.50 to 13.00
Relaying rails, standard section	23.00 to 28.00
Cast iron car wheels	13.50 to 14.00
No. 1 heavy railroad melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.75 to 10.00
Ordinary shoveling steel	9.50 to 10.00
Frogs, switches and guards, cut apart	10.00 to 10.50
Ordinary bundle sheet	1.00 to 4.50
Cast steel bolsters	9.50 to 10.00
Per Net Ton	
Heavy axes and tire turnings	6.00 to 6.50
Iron angle bars	13.00 to 13.50
Steel angle bars	9.00 to 9.50
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealers' forge	8.00 to 8.50
Cast iron borings	5.50 to 6.00
No. 1 bushelling	8.50 to 9.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	11.00 to 11.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	5.50 to 6.00
Light railroad sheet	3.50 to 4.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	3.00 to 3.50
Country mixed iron	6.00 to 6.50
Unheat railroad mixed	7.00 to 7.50
Horsehoe	9.50 to 10.00
Railroad brake shoes	9.50 to 10.00

Buffalo

Buffalo, Feb. 14.

Pig Iron.—With radiator interests having contracted for their wants for February and March and possibly well into April, this market has settled into a condition where small business is the rule and none of this extends beyond second quarter delivery. It is generally understood the American Radiator Co. has bought between 25,000 and 35,000 tons from a Buffalo furnace and that \$18 base was the price. No inquiry was sent out on this purchase and verification of the details is not available from either the furnace or the purchaser. Carload lot purchases are freely closed at \$18.50 and \$19, and a furnace which has consistently quoted \$19.50 is not getting any business in consequence. Other than carload lot business the only inquiry out is one for 500 tons of No. 2X for a buyer in New York State outside Buffalo. Buffalo iron is quoted at \$18.50 in any quantity desired. The status of the New York vehicular project is unchanged insofar as Buffalo furnaces are concerned and quotations are made for delivery to the end of June only.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$19.50 to \$20.00
No. 2X foundry, 2.25 to 2.75 sil.	19.00 to 19.50
No. 2 plain, 1.75 to 2.25 sil.	18.50 to 19.00
Basic	18.00 to 18.25
Malleable	19.50
Lake Superior charcoal	31.75

Finished Iron and Steel.—In the volume of business placed the general situation compares with December, which was unusually quiet. January business held up

surprisingly well when tonnages were finally reckoned. Carload lots and less represent the size of tonnages in demand. With the exception of sheets, prices are irregular, but in the exception noted prices have held up and 3c. is generally quoted. The Lackawanna Bridge Co. will erect two bridges in Tonawanda, N. Y., the total requirements being 300 tons. The same interest has also contracted for a skating rink in Princeton, N. J., requiring 150 tons. Inquiries are out for 500 tons of shapes for use in erecting a school building in Corning, N. Y., and a new bank building at Niagara Falls, N. Y., involving 100 tons.

We quote wire-rod prices for Buffalo as follows: Structural shapes, 2.50c.; plates, 2.65c.; flats, No. 8 gage, 2.30c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.10c.; hot-rolled sheets, No. 10, 2.40c.; galvanized steel sheets, No. 10, 3.20c.; black sheets, No. 75, 4.20c.; cold-rolled strip steel, 2.20c.; cold-rolled round shafting, 3.40c.

Old Material.—Several lots of 1000 tons and a number of lesser tonnages of heavy melting steel have been bought by a mill interest at \$13.50. The demand for turnings and borings from the Youngstown and Pittsburgh districts continues to appear here, but production is so light that little of this business will be placed with Buffalo dealers. A number of foundries interested in the New York vehicular tunnel project are inquiring for cast scrap, but Buffalo dealers quoting \$16 to \$17 on this material have not interested these prospective buyers, who can buy pig iron in the same market for \$18.50 or less.

We quote latest selling prices per gross ton for Buffalo as follows:

Heavy pig iron, 1000 lb.	\$12.00 to \$14.00
Low pig iron, 1000 lb. and under	11.00 to 13.00
Soft pig iron, 1000 lb.	13.00 to 16.00
Cast iron, 1000 lb.	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cold-rolled iron, 1000 lb.	7.00 to 8.00
Heavy steel, 1000 lb.	10.00 to 11.50
Galvanized sheet, 1000 lb.	12.00 to 13.00
No. 10 blue sheet	10.00 to 11.00
Sheet, plates	15.00 to 16.00
Hot-rolled sheet, turnings	8.00 to 9.00
No. 10 machine iron, 1000 lb.	17.00 to 18.00
Hydraulic cylinder, 1000 lb.	10.00 to 11.50
Ball and roller, 1000 lb.	13.00 to 14.00

Fred J. Waldow, salesman, Rogers, Brown & Co., Justus Egbert, purchasing agent American Radiator Co., and William J. McClain, district sales agent Republic Iron & Steel Co., announce the formation of a partnership to engage in sales of pig iron, coal, coke, alloys and steel products. The new firm will do a brokerage business.

Cleveland

(CLEVELAND, Feb. 14.)

Iron Ore.—In the opinion of ore men, some blast furnace interests are looking for greater reductions in ore prices than are likely to be made. Some consumers have been talking of a cut of \$1 or more a ton from last season's prices. The mine operators point out that while labor costs have been reduced, their other mining costs are as high as last year. The largest items of cost in mine operations, outside of labor, are for lumber and coal. Many mining companies, because of curtailment of operations, carried over large stocks of coal last year, so that they are not getting the benefit of lower coal prices. Whatever reductions are made on ore prices will depend largely on what changes are made in transportation charges. Prospects do not seem bright for a reduction in rail rates during the coming ore carrying season, but a 10 per cent cut in the vessel rate on ore is expected. While a large share of the underground mines are now operating in the Lake Superior district, this is not because sellers need the ore, but only to furnish work for the men. Ore stock piles are already unusually large.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.10; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mexico Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.50.

Pig Iron.—Furnaces booked a fair number of orders for foundry iron during the week, but in most cases the tonnage involved was small, the largest lots being 300 to 400 tons. One lake furnace sold 4000 tons including three lots of malleable iron aggregating 400

tons. Prices continue to show a weakness on sales to competitive points. One lake furnace is quoting No. 2 foundry iron down to \$18.50 for shipment to points where it must meet competition, but is asking \$19 to \$19.50 for iron for nearby delivery. However, it seems probable that \$18.50 could be shaded. In fact, one sale in the Indiana territory is reported at \$18.25. Present prices on Southern iron have reached a level where they are becoming a factor in competition for shipment to some central and southern Ohio points and probably have some bearing on the weakness of Northern iron. The Detroit, Toledo & Ironton Railroad has announced a 53c. per ton rate reduction on pig iron from Toledo, effective Feb. 20, making the rate to Springfield \$2.13 as compared to \$2.02 from the Ironton district. The Standard Sanitary Mfg. Co. has received quotations on 2000 tons or more of Southern iron for February and March shipment to its Louisville plant and is expected to close for this business to-day. A quotation of \$15.50 has been made on this iron. This company is also understood to be in the market for a round lot of Northern foundry iron for early shipment.

Quotations below are for local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$1.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	\$19.71
Northern No. 2 fdy., sil. 1.75 to 2.25	\$19.00 to 20.00
Southern fdy., sil. 1.75 to 2.25	22.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	32.00

Semi-Finished Steel.—The demand shows an improvement. A Cleveland mill has placed 800 tons of sheet bars with a Youngstown mill at \$29, and another inquiry for 500 tons is pending. A Cleveland consumer has placed 150 tons of forging billets.

Finished Material.—The improvement in the demand noted last week continues. While few large orders are being placed, mills are getting a moderate volume of business from various industries and reports indicate that manufacturing plants are getting busier. Automobile manufacturers are buying a little more freely. An order from an Ohio automobile plant was for 750 tons of bars. Several small lots of steel were placed by agricultural implement manufacturers. Little change is noted in the price situation. Steel bars, plates and structural material are quoted at 1.40c., Pittsburgh, for desirable orders, with car lot sales being made in many cases at 1.50c. On boiler plates a 1.40c. price has appeared and an Eastern mill that has been quoting these at 1.60c. has reduced its price to 1.50c. for desirable orders. The demand for hot-rolled strip steel has improved and some makers of this steel now have a fair order book. The Trumbull Steel Co. has advanced its price on hot-rolled strip steel to 2c. An automobile parts manufacturer is considering his requirements for the year for the manufacture of tubing which may result in the placing of 9000 tons of strip steel or skelp. The structural outlook continues to improve. Some building projects that were held up last year are being revived and with the approach of spring considerable school building work is coming up in Ohio. An inquiry for approximately 900 tons for the sintering plant for the McKinney Steel Co. plant has come out. Bids have been taken for a municipal power plant in Lansing, Mich., requiring 1500 tons. A building for the Ohio Wesleyan University, Delaware, will require 300 tons. Bids for a Y. M. C. A. building, Columbus, requiring 500 tons, have been rejected and new bids will be taken. A reservoir in Detroit will require 1500 tons of reinforcing bars. Hard steel bars are still quoted at 1.40c., but a round lot inquiry would probably bring out a lower price because of the competition of soft steel bars. The Cleveland Railway Co. is inquiring for 1000 tons of rails.

Jobbers quote steel bars, 2.36c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3.25c.; No. 9 annealed wire, 2.75c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 14 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—The demand shows a little improvement, but few orders are coming out for more than car lots. The Ford Motor Co. has divided an order for 1500 tons of frame and crank case stock between three mills. Regular prices appear to be holding well.

Bolts and Nuts.—The demand for bolts and nuts shows improvement, but consumers are buying only in small lots. The minimum discounts have virtually disappeared on machine and carriage bolts, but local makers claim they are not shading prices that have been quoted recently as maximum discounts. Prices on machine bolts, cold-punched chamfered and trimmed nuts are lower. Rivets are still in light demand. Local makers are adhering to regular prices, although these are being shaded by some makers \$1 to \$2 a ton.

Alloy Steel.—The demand for alloy steel has improved, some good orders having come from the automotive industry. The United Alloy Steel Corporation, Canton, which is operating five open-hearth furnaces is planning to start additional furnaces. The Central Steel Co., Massillon, has started two additional open-hearth furnaces, now operating six of its nine furnaces. Alloy steel prices are fairly firm. Makers quote 3½ per cent nickel steel at 5c.; chrome nickel steel 4c., and chrome vanadium steel 5c. for bars and 4.75c. per lb. for spring steel.

Old Material.—The market is dull and inclined to weakness. The only local activity reported is the purchase of a few small lots of heavy melting steel by a Cleveland consumer at \$13 delivered. In the absence of activity, prices on blast furnace scrap which were recently advanced have declined 25c. a ton. The buying that was expected from the Youngstown district steel plants during February has as yet failed to materialize. There is little demand except for blast furnace scrap. Transactions between local dealers were few during the week as they are well cleaned up on old orders.

We quote per gross ton, fob Cleveland, as follows:

Heavy melting steel	\$12.00 to \$13.50
Steel rails, under 3 ft.	12.50 to 13.00
Steel rails, rerolling	11.00 to 11.50
Iron rails	12.00 to 12.50
Iron cut axle	18.00 to 19.00
Low phosphorus melting	15.00 to 13.50
Cast borings	9.00 to 9.25
Machine shop turnings	9.00 to 9.25
Mixed borings and short turnings	9.00 to 9.25
Compressed steel	9.00 to 9.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet groupings	6.00 to 7.00
Steel axle turnings	9.50 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.75 to 9.00
Drop forge flashings, over 10 in.	8.75 to 9.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Interest in Basing Point at Cleveland

The Cleveland Chamber of Commerce has appointed a special committee of seven members on basing points for steel and this committee will at once become very active in investigating the subject, although it has not yet outlined its plan of procedure. The Milwaukee hearing before the Federal Trade Commission on the Pittsburgh basing point practice and the recent complaints of some Cleveland manufacturers against using a Pittsburgh base have tendered to stimulate interest in the subject in Cleveland. Fred L. Borton is chairman of the committee and F. H. Baer, chairman of the Traffic Committee of the Chamber of Commerce, is secretary.

The Youngstown Pressed Steel Co., Warren, Ohio, closely allied with the Sharon Steel Hoop Co., Sharon, Pa., is enlarging its capacity for the production of metal lath, installing additional machinery. With its new layout, manual labor will be reduced to a minimum, various steps in the manufacturing processes being carried forward mechanically.

The Federated American Engineers, including the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers, Boston, are to maintain a volunteer employment committee. This committee will endeavor to relieve the unemployment problem among their professions in and about Boston.

Cincinnati

CINCINNATI, Feb. 14.

Pig Iron.—The market was quiet again last week although some sales of Southern iron were reported outside the immediate Cincinnati district. A radiator company is reported to have purchased 1500 tons of Southern iron at \$16 furnace, and a sanitary manufacturing company in Indiana took 500 tons of Southern iron at \$16 furnace base. The delivered price on this iron, which will be shipped by river and rail, is understood to be about \$2 a ton less than if the iron were shipped by the all rail route. An Indiana manufacturer is understood to have purchased 300 tons of 3.75 to 4.25 silicon at a price of \$18.50 Northern furnace. Several other sales of 100 tons each are reported, mostly of Southern iron at a \$15.50 base. The Standard Sanitary Mfg. Co. has an inquiry out for 1500 tons for its Louisville plant and will likely close the deal to-day. It is said that \$15.50 is the lowest price quoted on this inquiry. Other inquiries include one for 400 tons from Anderson, Ind.; one from Mansfield for 100 tons and one of 200 tons from Ft. Wayne. Prices are inclined to be weaker. It is said Chicago iron can now be purchased at \$18 furnace, and Lake iron from \$18 to \$18.50 regardless of silicon content. Southern Ohio furnaces have reduced their prices 50c. a ton and now are quoting \$19 to \$19.50, Ironton. Jackson county furnaces have cut prices on silvery and bessemer ferro-silicon \$2 a ton, effective Feb. 13. This makes 8 per cent silvery, \$27.50 furnace.

Based on freight rates of \$1.50 from Birmingham and \$1.25 from Ironton, we quote fob Cincinnati:

Southern coke, 1 1/2 to 2 1/2, class 1	\$20.00 to \$20.50
Southern coke, 1 1/2 to 2 1/2, class 2	20.50 to 21.00
Ohio silvery, 8 per cent	20.50 to 21.00
Southern Ohio coke, sil. 1.75 to 2.25	21.52 to 22.02
(No. 2)	21.52 to 22.02
Basic, Northern	21.02 to 21.52
Malleable	21.02 to 22.52

Finished Material. An order for 1000 tons of plates is reported to have been placed by a tank manufacturer in this district, who recently secured an order for a large tank to be erected in California. Several 200 ton orders for structural shapes are also reported, but as a general thing inquiries are confined to carload lots and most of the business booked is being done on a single carload basis. There is still a fair demand for concrete reinforcing bars, as a number of small projects taking up to 100 tons are going ahead. The demand for sheets is reported to be picking up slightly, but there is no disposition on the part of buyers to contract ahead, the orders placed being for immediate shipment. Fairly good demand for wire products is reported. Prices on all finished products are ruling about the same as last week, 1.40c. now being the general quotation on bars, shapes and plates, although there is some disposition on the part of a few mills to hold out for 1.50c. Very little is heard of lower prices on sheets and it is said that 2.75c. and 3.75c. for black and galvanized respectively exist only in the imagination of some buyers, all of the orders now being placed are on the 3c. and 4c. base. In the structural field, the only new inquiry to come out was for the Athletic Club at Indianapolis involving between 1500 and 2000 tons. Bids will close on March 1 and it is expected that bids will also be taken on the Wilde Bank Building in the same city at the same time. Plans for this building, however, have not been sent out. The National Cash Register Co. has let the general contract for new buildings at Dayton to the H. K. Ferguson Co. at Cleveland; 250 tons of steel will be used. It is reported that the Belknap Hardware job at Louisville will be up again shortly for bids as some changes are being made in the plans. An auditorium at Memphis will also likely be refigured in the near future. Pending projects include a ten-story building to the Rollman department store in Cincinnati, an office building for the Southern Railroad in the same city and hotel building at Frankfort, Ky. The first two of these will be probably of reinforced concrete construction and the latter of steel. The Big Four Railroad closed bids on its axle requirements for the first quarter. The Standard Forge Co. was low

bidder, car axles being quoted at 2.05c. per lb., engine truck axles at 2.40c. per lb. and drivers and trailers at 3.40c. per lb., f.o.b. Chicago. In regard to plant operations, the East Side works of the American Rolling Mill Co. is running full time and the Newport Rolling Mill Co. has four mills on. The steel and sheet mills of the Ashland Iron & Mining Co. are closed down at the present time, but will likely reopen in two weeks.

Warehouse Business. Local jobbers report business as quiet during the past week. Some orders for wire products, however, are being booked for spring delivery. Local jobbers have cut the price on wire nails to \$2.95 per keg base. All other prices are unchanged.

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$2.95 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Coke.—Some fair-sized orders for prompt shipment coke are reported, two of these being for 600 tons each. The coke market is firming up slightly and some operators have withdrawn prices for nearby shipment. Prices, however, are generally as quoted in last week's report.

Old Material.—The scrap market is quotably weaker and while it is expected that steel companies operating in this district will shortly be in the market for small tonnages, present business is very quiet. Most dealers have marked down their prices on practically all items 50c. per ton. The Norfolk and Western railway is offering 6000 tons.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton	
Bundled sheets	\$3.50 to \$4.00	
Iron rails	11.50 to 12.00	
Relaying rails, 50 lb. and up	24.50 to 25.00	
Relaying steel rails	10.00 to 10.50	
Heavy melting steel	8.50 to 9.00	
Steel rails for melting	8.50 to 9.00	
Car wheels	11.50 to 12.50	
	Per Net Ton	
No. 1 railroad wrought	8.00 to 8.50	
Cast borings	3.00 to 3.50	
Steel turnings	2.00 to 2.50	
Railroad cast	11.50 to 12.00	
No. 1 machinery	13.00 to 13.50	
Burnt scrap	7.00 to 7.50	
Iron axles	15.00 to 15.50	
Locomotive tires (smooth inside)	9.00 to 9.50	
Pipes and flues	3.50 to 4.00	

Rogers, Brown & Co. pig iron and coke merchants have been appointed sole agents for the sale of Tuscaloosa and Warrior pig iron produced at Holt, Ala. The furnace company reserves the right of making sales direct to buyers in Alabama and the adjoining States. All other business will be handled through Rogers, Brown & Co. Tuscaloosa is one of the old popular brands of Southern, high in manganese and low in phosphorus. The Warrior brand is a high manganese specialty.

San Francisco

SAN FRANCISCO, Feb. 8.

Pig Iron.—The dull condition prevailing at the first of the year has not yet been relieved on the Coast. In the San Francisco market, business has been especially trivial during the past 10 days or two weeks, practically no sales of any significance having been reported, although routine buying in small lots is not wanting. Again the Southern Pacific Co. affords the major interest, this road just having closed for 400 tons of 1.75 to 2.25 silicon, 250 tons of 2.25 to 2.75 and 100 tons of standard Bessemer. It is reported that large users have just taken 500 tons of No. 1 foreign iron at Tacoma and 500 tons at San Pedro, the price being very favorable. There are liberal offerings of material here at present, and some large dealers report working on a considerable tonnage of domestic iron, which is approximately on the same basis as foreign. Quotations around \$28 are heard on American pig, for Gulf shipment, delivered here. The foreign iron market appears to be firming, with the strengthening of exchange rates and a tendency of freight rates to advance. In the absence of demand and actual sales, it is difficult to estimate the market accurately,

but prices asked appear to range from about \$27 to \$30 for good grades, ex ship, San Francisco.

Cast Iron Pipe.—Since the moderately good activity of several weeks ago, business in pipe has been quieter, both from municipal and private sources. The market is ruling around \$32 base, with the tendency toward higher levels. The 2000 tons for Portland was recently awarded to the United States Cast Iron Pipe & Foundry Co. Bids which the city of Seattle received for 2143 tons have been rejected, and it is reported it will readvertise about the end of the present month. Glendale, Cal., is asking for bids on Feb. 9 for 300 tons of 4-in. pipe, and San Bernardino the following day for 77 tons. Santa Barbara on Feb. 11 will be in the market for 30 tons.

Finished Iron and Steel.—It is a dull situation which is to be reported in this district, about the only feature being a moderate demand in small quantities for mixed materials. Prices seem to be holding pretty well, but there is no assurance of stability, except as at present, when demand is virtually absent. The larger producers are looking for a betterment in the following two or three months, but nothing large is foreseen at this time. There is fair prospect for building operations around San Francisco, which will mean a fair demand for bars. Seattle is reported inquiring in this market for 1000 tons of low range section girder rails. The Southern California Edison Co.'s contract for from 1100 to 1200 tons of hammered welded pipe was reported awarded to an Eastern fabricator.

Coke.—A steady consumption of coke in this district is reported, the main demand coming from smelters, since foundry operations are on such a narrow, hand-to-mouth basis. A considerable quantity of English material is loading and some is en route. Stocks in consumers' hands here generally are low.

Old Material.—Buying has been active in scrap of late, but this does not indicate a revival of foundry operations. A large quantity of railroad accumulation was disposed of at the prevailing market of \$10 a gross ton for heavy melting steel, delivered at the consumer's mill. Around 12,000 tons was taken by various interests. Most users, accordingly, are heavily stocked with scrap at present. Moreover, about 6000 tons of steel and cast scrap will be offered from the old cruiser Brooklyn, which is to be dismantled. The Pacific Coast Steel Co. will start up its open-hearth furnace March 1, which has been idle since last June. This is necessitated by the accumulation of ingots being exhausted.

British Pig Iron and Steel Output for January

LONDON, ENGLAND, Feb. 14 (By Cable).

The production of pig iron in Great Britain in January was 288,000 gross tons and that of steel ingots and castings 327,500 tons. These compare with an output of 275,000 tons of pig iron and of 381,000 tons of steel in December. The January pig iron is the largest since last March. The steel output is the lowest in six months.

The United States Malleable Iron Co., Toledo, Ohio, is reported to have received a large number of orders for malleable castings which will permit it to increase its present operating force during February from 150 to 650 men. It will also resume operations in its Wauseon, Ohio, plant with a force of about 175 employees.

There are now 95 Baily electric furnaces for melting non-ferrous metals and alloys and 34 Baily electric heat-treating furnaces operating in the United States and Canada, according to the January issue of *Electric Furnace News*, published by the Electric Furnace Co., Salem, Ohio.

The National Safety Congress held annually under the auspices of the National Safety Council, the headquarters of which are in Chicago, will meet in Detroit the week beginning Aug. 28. The Safety Council of Detroit Board of Commerce has started to make preparations and a large attendance is expected.

British Iron and Steel Market

**Steel Consumers Awaiting Price Concessions—
Tin Plate Makers Expect Lower
Steel—Coke Is Higher
(By Cable)**

LONDON, ENGLAND, Feb. 14.

PIG iron sales are increasing and traders are now more confident of the commencement of a genuine revival. Practically all production of Cleveland iron is going into consumption. Hematite is firmer; makers are well booked up and there is a fair demand from the Continent.

Best Bilbao Rubio is sold up to 26½s. (\$5.78) ex-ship Tees, an advance of 1s. (22c.) over last week.

Continental inquiries are coming in for foundry coke. Durham blast furnace coke is dearer.

India is inquiring for 15,000 tons of steel plates, delivery to be distributed over two years. The steel business generally is quieter; consumers are still awaiting price reductions.

Finished iron is cheaper. Crown iron bars are offered at £11 (2.14c. per lb.) f.o.b. Staffordshire. Marked bars are held at £14 10s. (2.82c. per lb.).

Continental quotations are slightly harder. French merchant bars are held at £8 15s. (1.70c. per lb.) f.o.b., for April and May delivery. Luxemburg merchant bars are offered at £8 to £8 5s. (1.56 to 1.61c. per lb.) for April and May shipment. Luxemburg structural shapes are quoted at £7 10s. to £7 15s. (1.46 to 1.51c. per lb.) f.o.b., for April and May delivery.

Belgian wire rods are held at £9 to £9 15s. (\$39.24 to \$42.51) f.o.b., April and May shipment. French wire rods are offered at £9 10s. (\$41.42) f.o.b., for May and June delivery. German 3/16-in. plates are quoted at £7 15s. (1.51c. per lb.) f.o.b. for June and July shipment.

Continental foundry iron is offered at £5 5s. (\$22.89).

Tin plate is weaker. Makers are selling in anticipation of a reduction in steel prices. Stock 14 x 20 in. are being sold at 18½s. (\$4.03) f.o.b., for February and March shipment; 250,000 boxes of oil sizes have been placed in Wales at 18¼s. (\$4.09 basis, f.o.b.).

Galvanized sheets are being sold to Argentina at £16 5s. (3.16c. per lb.) f.o.b., in cases. Australia has bought some small lines at £15 15s. (3.07c. per lb.) f.o.b. Japan 67's are being sold at £23 (4.48c. per lb.) f.o.b.

India has bought black sheets at £12 15s. (2.48c. per lb.) f.o.b., basis 24 gage. France is paying £12 10s. to £13 (2.43 to 2.53c. per lb.) f.o.b. Japan 33's for galvanizing have been sold at £15 15s. to £16 (3.07 to 3.11c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.36 per £1 as follows:

Durham coke, delivered.	11 8s	\$6.10
Cleveland No. 1 foundry.	4 15	29 71
Cleveland No. 3 foundry.	4 10	19 62
Cleveland No. 4 foundry.	4 7½	19 07
Cleveland No. 1 forge.	4 10	19 62
Cleveland basic.	4 10	19 62
Hematite.	7 0*	36.52*
East Coast mixed.	1 12½ to 1 15	20 16 to \$20.71
Perronmanganee.	15 0 & 14 10*	65 10 & 63 22*
Rails, 60 lb and up.	8 0 to 9 10	31.88 to 41.42
Billets.	7 0 to 7 10	30.52 to 32.70
Sheet and tin plate bars		
Welsh.	7 5 to 7 7½	31.61 to 32 15
Tin plate, base box.	0 18½ to 0 19	4.63 to 4.14
		C per Lb.
Ship plates.	9 0 to 10 10	1 75 to 2.04
Boiler plates.	12 10 to 14 0	2.43 to 2.72
Tees.	9 10 to 11 0	1.85 to 2.14
Channels.	8 15 to 10 5	1 70 to 1.99
Beams.	8 5 to 10 0	1 61 to 1.95
Round bars, ¾ to 3 in.	10 10	2.91
Galvanized sheets, 24 g.	15 12½ to 16 0	2 91 to 3.11
Black sheets.	12 10 to 13 0	2 13 to 2 53
Steel hoops.	12 0 & 12 5*	2 34 & 2 38*
Cold rolled steel strip 20 g.	13 10	4 57

*Export price

MODERATE IMPROVEMENT

Youngstown Mills Report Better Buying, Especially of Lighter Lines

YOUNGSTOWN, Feb. 14.—Moderate improvement in buying of steel products, principally affecting the lighter lines, is noted. The Ford Motor Co. and Dodge Brothers are entering the market for larger sheet requirements, against broadened production schedules. Actual buying of sheets, however, is still restricted.

Valley furnace interests are attempting to hold to an \$18 minimum on standard basic pig iron, despite the sale of a 1000-ton lot at \$17.75 by a Valley interest. One of the larger independents appraises the market at \$18 to \$18.25, depending upon size of the order and other special considerations. Aside from the regular buying by non-integrated interests, there is comparatively little activity in the iron market.

Wire products, particularly nails, are moving with more freedom, jobbers being important factors in the market. Such schedules show some pickup over previous weeks. The principal district independent states it is adhering to quotations of 2.25c. on plain wire and \$2.50 per base keg on nails, though concessions to large buyers are reported. Buying of nails has been stimulated by seasonal requirements.

Reports of Concessions on Sheets

Valley sheet makers are still following up reports of concession prices in sheets, and say that while quotations have been shaded elsewhere, they are holding firm in this district. In fact, one buying interest, which did considerable shopping to uncover a concession on a moderate tonnage, states that the market in the Valley is tight, and there appears to be a firm disposition on the part of producers to hold prices.

Placement of sheet business is confined to 25, 50 and 100-ton lots in the main. All interests are hopeful, however, that the month will bring out tonnage in sufficient volume to appreciably accelerate production.

Despite the fact that buying in finished lines, with possible exception of tin plate, lacks sustaining influence, railroads report that shipments of steel products from Valley mills are expanding. During the first six days of February, the Ohio region of the Erie Railroad handled 4456 loaded cars per day, as compared with an average daily movement in January of 3843 cars and 3371 cars per day in February, 1921.

The Franklin division of the New York Central System, handling tonnage from the Valleys, reports that it is moving 200 more cars per day than last year's average at this time. Shipments are running to pipe, tin*plate, sheets and coke oven by-products.

Inquiry for 1700 Tons of Sheets

An inquiry for a mixed lot of blue annealed, black and galvanized sheets involving 1700 tons, put forth by the Ford company, has made its appearance in this district.

Plate makers at Youngstown will benefit through a fabricating-in-transit rate on steel plates shipped to Sharon, Pa., fabricators, chiefly builders of steel cars and tanks. When this rate is finally approved, Youngstown plate interests will be enabled to ship their product to Sharon plants for working into cars and tanks at a rate based on the through rates from Youngstown to points of delivery for the completed product.

This will enable makers at Youngstown to compete on a more favorable basis with important plate interests in the East, which have heretofore enjoyed a rate advantage in this respect. Youngstown producers have been virtually shut out of the Sharon and Masury markets for some time by reason of this inequality.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery								
Copper, New York Straits			Lead			Zinc		
Feb.	Lake	Electro	Tin	New York	St. Louis	New York	St. Louis	
8.....	13.50	13.25	31.87½	4.70	4.40	4.85	4.50	
9.....	13.57½	13.12½	31.25	4.70	4.40	4.82½	4.47½	
10.....	13.25	13.00	30.75	4.70	4.40	4.85	4.50	
11.....	13.25	13.00	30.75	4.70	4.40	4.85	4.50	
12.....	13.25	13.00	30.75	4.70	4.40	4.85	4.50	

*Refinery quotation.

New York

NEW YORK, Feb. 11.

All the markets except lead are exceedingly inactive. Demand for copper does not improve and that for tin is brisk one day and lacking the next. Demand for lead continues steady and so do prices. Buying of zinc has not improved but quotations are stationary. Yesterday, Feb. 13, the markets were all closed in observance of Lincoln's birthday.

Copper.—Conditions which prevailed in this market in July, August and September have reappeared, in that there is a marked tendency on the part of dealers and speculators, as well as small producers, to liquidate their stocks. In some cases this has been necessary by the 10th of the month and in other cases before the end of the month, and has resulted in the offering of the market down until quotations have gradually declined again in the past week. Electrolytic copper for February-March delivery is quoted as low as 13.25c., delivered, or 13c., refinery. The amount available is not large but is apparently sufficient to meet the small buying power. Large producers, although they have somewhat modified their minimum selling prices, will not meet these low quotations and it is difficult to buy from those sources at less than 13.50c., delivered.

Tin.—With the exception of one day the market for Straits tin has been dull and uninteresting. On Friday, Feb. 10, however, consumers were buyers, and sales, estimated up to 600 tons and mostly future shipment, are reported to have been made. Following the holiday yesterday the market was quiet to-day and spot Straits tin was quoted at 30.75c., New York, quotations having declined gradually almost daily in the last week. London prices were also lower to-day by nearly £4 per ton than a week ago, with spot standard quoted at £152, future standard at £153 15s. and spot Straits at £154 10s. Arrivals thus far this month have been 1600 tons, with 8060 tons reported afloat.

Lead.—Demand and production continue to flow in the steady stream which has characterized this market for so many weeks. As a consequence there has been no reason to elevate or depress prices. The leading interest continues to quote 4.70c., New York and St. Louis, and the outside market continues unchanged at 4.40c., St. Louis, or 4.70c. to 4.75c., New York and Eastern points, all for early or 30 day delivery.

Zinc.—There has been no change in the market for prime Western zinc either for the better or for the worse and quotations remain fairly firm at 4.50c., St. Louis, or 4.85c., New York, for early delivery. This price was slightly shaded on one or two days last week, but otherwise the market is steady and demand is still confined to small lots for early delivery. Interest continues keen in the possibility of exports to England, opinion in some quarters being optimistic and in others to the contrary.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted at 4.40c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted at 19c. to 19.10c. per lb., f.o.b. plant, depending on the quantity, by the leading producer and importations of the same grade are quoted at 17c. to 18c., New York, duty paid.

Old Metals.—The market continues very sluggish with a little easing off of prices. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.00
Copper, heavy and wire.....	12.00
Copper, light and bottoms.....	9.00
Heavy machine composition.....	10.00
Brass, heavy.....	7.50
Brass, light.....	5.75
No. 1 red brass or composition turnings.....	8.00
No. 1 yellow rod brass turnings.....	6.00
Lead, heavy.....	4.25
Lead, tea.....	3.25
Zinc.....	3.00

Chicago

FEB. 14.—In a quiet market tin and spelter have declined. The weakness in tin is accounted for by the large tonnage hanging over the market which has been held for over a year by the Federated Malay States and the Dutch Government respectively, their joint holdings being estimated at 14,000 tons. Naturally the trade is beginning to wonder when this unsold tonnage will be forced on the market. We quote in carload lots: Lake copper, 13.50c.; tin, 32.50c. to 33c.; lead, 4.50c.; spelter, 4.55c. to 4.60c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

FEB. 14.—Lead and zinc are unchanged. We quote lead, car lots, at 4.35c. to 4.40c.; slab zinc, 4.52½c. to 4.65c. On old material we quote: Light brass, 3.50c.; heavy yellow brass and light copper, 7c.; heavy copper and copper wire, 7.50c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Manganiferous Iron Ores Leaflets

An interesting leaflet on manganiferous iron ores has been published by Clement K. Quinn & Co., miners and shippers of iron ores, Duluth and Cleveland. Four definite assertions as to the effect of manganese in the blast furnace and open-hearth furnace are made as follows:

(1) High manganese iron is a help rather than a hindrance in blast furnace practice.

(2) High manganese iron improves the quality of open-hearth steel without reduction of tonnage or practice or other injurious effects.

(3) High manganese iron is of a very great assistance in meeting the demands for the better grades of steels, alloy steels, etc.

(4) Due to better surface conditions steel made from high manganese iron shows increased yields with ordinary rolling mill practice.

It is also urged that increasingly high sulphur fuels are making it more difficult for steel manufacturers to meet sulphur requirements and specifications without additional cost and it is urged that manganese is the answer. Various other benefits to be derived from the use of manganese are given.

The engineering association of the school of Liege, Belgium, will conduct a scientific congress on June 11 to 16 on the occasion of the seventy-fifth anniversary of the foundation of the school. The congress will comprise seven sections; mines, metallurgy, mechanical engineering, electricity, chemical industries, civil engineering and geology. The secretary-general of the association is O. Lepersonne, 16 Quai des Etats-Unis, Liege, Belgium. Circulars are available covering the questions which will be taken up by each section.

Herbert DuPuy, formerly chairman, Crucible Steel Company of America, on Feb. 10, filed a second suit against the company, claiming \$117,487.50 as the amount due him under a deferred compensation and bonus plan.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic...	\$0.36	Kansas City	\$0.815
Philadelphia, export...	0.265	Kansas City (pipe)...	0.77
Baltimore, domestic...	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic...	0.38	Omaha (pipe)	0.77
New York, export	0.235	Denver	1.35
Boston, domestic	0.405	Denver (wire products)...	1.115
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail...	0.555
Cincinnati	0.325	Jacksonville, rail and	
Indianapolis	0.345	water	0.46
Chicago	0.38	New Orleans	0.515
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 50c.; ship plates, 75c. ingot and much bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c. sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1. wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c., over 8 in. in diameter, 21c. per in. of fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1 in. thick and over, and zeeks, structural sizes, 1.40c. to 1.50c.

Sheared plates, 1/2 in. and heavier, tank quality, 1.40c. to 1.50c.

Wire Products

Wire nails, \$2.10 to \$2.40 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.15 to \$2.25, per 100 lb. annealed fence wire, Nos. 6 to 9, \$2.15 to \$2.25; galvanized wire, \$2.65 to \$2.75; galvanized barbed wire \$3.00 to \$3.15; galvanized fence staples, \$3.00 to \$3.15; painted barbed wire, \$2.55 to \$2.65; polished fence staples, \$2.55 to \$2.65; cement-coated nails, per count keg, \$1.00 to \$2.00, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on wire-wire fencing are 70 1/2 per cent off list for carload lots, 60 1/2 per cent for 1000-rod lots, and 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small rolled threads	70	10 and 10 per cent off list
Machine bolts, small cut threads	70	and 10 per cent off list
Machine bolts, larger and longer	70	and 10 per cent off list
Carriage bolts, 3/4 in. x 6 in.	70	and 10 per cent off list
Smaller and shorter rolled threads	70	and 10 per cent off list
Cut threads	70	per cent off list
Longer and larger sizes	70	per cent off list
Lag bolts	70	10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads	60	and 10 per cent off list
Other style heads	60	and 10 per cent extra
Machine bolts, c.p.c. and t. nuts, 3/4 in. x 4 in.		
Smaller and shorter	65	10 and 5 per cent off list
Larger and longer sizes	65	and 10 per cent off list
Hot pressed sq. or hex. blank nuts	\$5.50	off list
Hot pressed nuts, tapped	\$5.25	off list
C.p.c. and t. sq. or hex. blank nuts	\$5.25	off list
C.p.c. and t. sq. or hex. blank nuts, tapped	\$5.00	off list
Semi finished hex. nuts:		
1/2 in. to 9/16 in. inclusive	80	10 and 10 per cent off list
Small sizes S. A. 10	80	10, 10 and 10 per cent off list
3/4 in. to 1 in. inclusive, U. S. S. and S. A. 10		
	70	10, 10 and 10 per cent off list
Stove bolts in packages	80	10 and 5 per cent off list
Stove bolts in bulk	80	10 and 7 1/2 per cent off list
Tire bolts	65	10 and 10 per cent off list
Track bolts, carloads	3c. to 3.25c.	base
Track bolts, less than carloads	4c. to 4.25c.	

Upset and Hex. Head Cap Screws

1/2 in. and under	80	10 and 10 per cent off list
9/16 in. to 1 in.	80	and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

1/2 in. and under	80	10 and 5 to 85 per cent off list
9/16 in. to 1 in.	80	10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes	75	and 10 to 80 per cent off list
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Milled Set Screws

All sizes	70	10 and 10 per cent off list
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Rivets

Large structural and ship rivets	\$2.25
Large boiler rivets	2.35
Small rivets, 7/16, 10 and 10 to 7/16, 10, 10 and 5 per cent off list	

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36 to \$37, chain rods, \$36 to \$37, screw stock rods, \$41 to \$42; rivet and bolt rods and other rods of that character, \$36 to \$37, high carbon rods \$13 to \$19, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.10 to \$2.20 base per 100 lb. in lots of 200 lbs. of 200 lb. each or more; spikes, 1/2-in., 3/4-in. and 7/16-in., \$2.25 to \$2.30 base; 5/16-in., \$2.25 to \$2.30 base. Boat and barge spikes, \$2.25 to \$2.30 base per 100 lb. in carload lots of 200 lbs. or more, f.o.b. Pittsburgh. Track bolts 3/4 to 2 1/2 in. base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.10 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package, 8-lb. coating, 1 C., \$9.60; 15-lb. coating, 1 C., \$11.80; 20-lb. coating, 1 C., \$12; 25-lb. coating, 1 C., \$14.25; 30-lb. coating, 1 C., \$15.25; 35-lb. coating, 1 C., \$16.25; 40-lb. coating, 1 C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1 1/2 in. to 1 1/2 in. round mill. Reburied bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh having said:

Steel			Butt Weld			Iron		
Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.
1 1/2 to 2	50 1/2	53	1 1/2 to 2	36 1/2	38 1/2	2 1/2 to 3	36 1/2	38 1/2
2 1/2 to 3	50 1/2	53	2 1/2 to 3	36 1/2	38 1/2	3 1/2 to 4	36 1/2	38 1/2
3 1/2 to 4	50 1/2	53	3 1/2 to 4	36 1/2	38 1/2	4 1/2 to 5	36 1/2	38 1/2
4 1/2 to 5	50 1/2	53	4 1/2 to 5	36 1/2	38 1/2	5 1/2 to 6	36 1/2	38 1/2
5 1/2 to 6	50 1/2	53	5 1/2 to 6	36 1/2	38 1/2	6 1/2 to 7	36 1/2	38 1/2
6 1/2 to 7	50 1/2	53	6 1/2 to 7	36 1/2	38 1/2	7 1/2 to 8	36 1/2	38 1/2
7 1/2 to 8	50 1/2	53	7 1/2 to 8	36 1/2	38 1/2	8 1/2 to 9	36 1/2	38 1/2
8 1/2 to 9	50 1/2	53	8 1/2 to 9	36 1/2	38 1/2	9 1/2 to 10	36 1/2	38 1/2
9 1/2 to 10	50 1/2	53	9 1/2 to 10	36 1/2	38 1/2	10 1/2 to 11	36 1/2	38 1/2
10 1/2 to 11	50 1/2	53	10 1/2 to 11	36 1/2	38 1/2	11 1/2 to 12	36 1/2	38 1/2
11 1/2 to 12	50 1/2	53	11 1/2 to 12	36 1/2	38 1/2	12 1/2 to 13	36 1/2	38 1/2
12 1/2 to 13	50 1/2	53	12 1/2 to 13	36 1/2	38 1/2	13 1/2 to 14	36 1/2	38 1/2
13 1/2 to 14	50 1/2	53	13 1/2 to 14	36 1/2	38 1/2	14 1/2 to 15	36 1/2	38 1/2
14 1/2 to 15	50 1/2	53	14 1/2 to 15	36 1/2	38 1/2	15 1/2 to 16	36 1/2	38 1/2
15 1/2 to 16	50 1/2	53	15 1/2 to 16	36 1/2	38 1/2	16 1/2 to 17	36 1/2	38 1/2
16 1/2 to 17	50 1/2	53	16 1/2 to 17	36 1/2	38 1/2	17 1/2 to 18	36 1/2	38 1/2
17 1/2 to 18	50 1/2	53	17 1/2 to 18	36 1/2	38 1/2	18 1/2 to 19	36 1/2	38 1/2
18 1/2 to 19	50 1/2	53	18 1/2 to 19	36 1/2	38 1/2	19 1/2 to 20	36 1/2	38 1/2
19 1/2 to 20	50 1/2	53	19 1/2 to 20	36 1/2	38 1/2	20 1/2 to 21	36 1/2	38 1/2
20 1/2 to 21	50 1/2	53	20 1/2 to 21	36 1/2	38 1/2	21 1/2 to 22	36 1/2	38 1/2
21 1/2 to 22	50 1/2	53	21 1/2 to 22	36 1/2	38 1/2	22 1/2 to 23	36 1/2	38 1/2
22 1/2 to 23	50 1/2	53	22 1/2 to 23	36 1/2	38 1/2	23 1/2 to 24	36 1/2	38 1/2
23 1/2 to 24	50 1/2	53	23 1/2 to 24	36 1/2	38 1/2	24 1/2 to 25	36 1/2	38 1/2
24 1/2 to 25	50 1/2	53	24 1/2 to 25	36 1/2	38 1/2	25 1/2 to 26	36 1/2	38 1/2
25 1/2 to 26	50 1/2	53	25 1/2 to 26	36 1/2	38 1/2	26 1/2 to 27	36 1/2	38 1/2
26 1/2 to 27	50 1/2	53	26 1/2 to 27	36 1/2	38 1/2	27 1/2 to 28	36 1/2	38 1/2
27 1/2 to 28	50 1/2	53	27 1/2 to 28	36 1/2	38 1/2	28 1/2 to 29	36 1/2	38 1/2
28 1/2 to 29	50 1/2	53	28 1/2 to 29	36 1/2	38 1/2	29 1/2 to 30	36 1/2	38 1/2
29 1/2 to 30	50 1/2	53	29 1/2 to 30	36 1/2	38 1/2	30 1/2 to 31	36 1/2	38 1/2
30 1/2 to 31	50 1/2	53	30 1/2 to 31	36 1/2	38 1/2	31 1/2 to 32	36 1/2	38 1/2
31 1/2 to 32	50 1/2	53	31 1/2 to 32	36 1/2	38 1/2	32 1/2 to 33	36 1/2	38 1/2
32 1/2 to 33	50 1/2	53	32 1/2 to 33	36 1/2	38 1/2	33 1/2 to 34	36 1/2	38 1/2
33 1/2 to 34	50 1/2	53	33 1/2 to 34	36 1/2	38 1/2	34 1/2 to 35	36 1/2	38 1/2
34 1/2 to 35	50 1/2	53	34 1/2 to 35	36 1/2	38 1/2	35 1/2 to 36	36 1/2	38 1/2
35 1/2 to 36	50 1/2	53	35 1/2 to 36	36 1/2	38 1/2	36 1/2 to 37	36 1/2	38 1/2
36 1/2 to 37	50 1/2	53	36 1/2 to 37	36 1/2	38 1/2	37 1/2 to 38	36 1/2	38 1/2
37 1/2 to 38	50 1/2	53	37 1/2 to 38	36 1/2	38 1/2	38 1/2 to 39	36 1/2	38 1/2
38 1/2 to 39	50 1/2	53	38 1/2 to 39	36 1/2	38 1/2	39 1/2 to 40	36 1/2	38 1/2
39 1/2 to 40	50 1/2	53	39 1/2 to 40	36 1/2	38 1/2	40 1/2 to 41	36 1/2	38 1/2
40 1/2 to 41	50 1/2	53	40 1/2 to 41	36 1/2	38 1/2	41 1/2 to 42	36 1/2	38 1/2
41 1/2 to 42	50 1/2	53	41 1/2 to 42	36 1/2	38 1/2	42 1/2 to 43	36 1/2	38 1/2
42 1/2 to 43	50 1/2	53	42 1/2 to 43	36 1/2	38 1/2	43 1/2 to 44	36 1/2	38 1/2
43 1/2 to 44	50 1/2	53	43 1/2 to 44	36 1/2	38 1/2	44 1/2 to 45	36 1/2	38 1/2
44 1/2 to 45	50 1/2	53	44 1/2 to 45	36 1/2	38 1/2	45 1/2 to 46	36 1/2	38 1/2
45 1/2 to 46	50 1/2	53	45 1/2 to 46	36 1/2	38 1/2	46 1/2 to 47	36 1/2	38 1/2
46 1/2 to 47	50 1/2	53	46 1/2 to 47	36 1/2	38 1/2	47 1/2 to 48	36 1/2	38 1/2
47 1/2 to 48	50 1/2	53	47 1/2 to 48	36 1/2	38 1/2	48 1/2 to 49	36 1/2	38 1/2
48 1/2 to 49	50 1/2	53	48 1/2 to 49	36 1/2	38 1/2	49 1/2 to 50	36 1/2	38 1/2
49 1/2 to 50	50 1/2	53	49 1/2 to 50	36 1/2	38 1/2	50 1/2 to 51	36 1/2	38 1/2
50 1/2 to 51	50 1/2	53	50 1/2 to 51	36 1/2	38 1/2	51 1/2 to 52	36 1/2	38 1/2
51 1/2 to 52	50 1/2	53	51 1/2 to 52	36 1/2	38 1/2	52 1/2 to 53	36 1/2	38 1/2
52 1/2 to 53	50 1/2	53	52 1/2 to 53	36 1/2	38 1/2	53 1/2 to 54	36 1/2	38 1/2
53 1/2 to 54	50 1/2	53	53 1/2 to 54	36 1/2	38 1/2	54 1/2 to 55	36 1/2	38 1/2
54 1/2 to 55	50 1/2	53	54 1/2 to 55	36 1/2	38 1/2	55 1/2 to 56	36 1/2	38 1/2
55 1/2 to 56	50 1/2	53	55 1/2 to 56	36 1/2	38 1/2	56 1/2 to 57	36 1/2	38 1/2
56 1/2 to 57	50 1/2	53	56 1/2 to 57	36 1/2	38 1/2	57 1/2 to 58	36 1/2	38 1/2
57 1/2 to 58	50 1/2	53	57 1/2 to 58	36 1/2	38 1/2	58 1/2 to 59	36 1/2	38 1/2
58 1/2 to 59	50 1/2	53	58 1/2 to 59	36 1/2	38 1/2	59 1/2 to 60	36 1/2	38 1/2
59 1/2 to 60	50 1/2	53	59 1/2 to 60	36 1/2	38 1/2	60 1/2 to 61	36 1/2	38 1/2
60 1/2 to 61	50 1/2	53	60 1/2 to 61	36 1/2	38 1/2	61 1/2 to 62	36 1/2	38 1/2
61 1/2 to 62	50 1/2	53	61 1/2 to 62	36 1/2	38 1/2	62 1/2 to 63	36 1/2	38 1/2
62 1/2 to 63	50 1/2	53	62 1/2 to 63	36 1/2	38 1/2	63 1/2 to 64	36 1/2	38 1/2
63 1/2 to 64	50 1/2	53	63 1/2 to 64	36 1/2	38 1/2	64 1/2 to 65	36 1/2	38 1/2
64 1/2 to 65	50 1/2	53	64 1/2 to 65	36 1/2	38 1/2	65 1/2 to 66	36 1/2	38 1/2
65 1/2 to 66	50 1/2	53	65 1/2 to 66	36 1/2	38 1/2	66 1/2 to 67	36 1/2	38 1/2
66 1/2 to 67	50 1/2	53	66 1/2 to 67	36 1/2	38 1/2	67 1/2 to 68	36 1/2	38 1/2
67 1/2 to 68	50 1/2	53	67 1/2 to 68	36 1/2	38 1/2	68 1/2 to 69	36 1/2	38 1/2
68 1/2 to 69	50 1/2	53	68 1/2 to 69	36 1/2	38 1/2	69 1/2 to 70	36 1/2	38 1/2
69 1/2 to 70	50 1/2	53	69 1/2 to 70	36 1/2	38 1/2	70 1/2 to 71	36 1/2	38 1/2
70 1/2 to 71	50 1/2	53	70 1/2 to 71	36 1/2	38 1/2	71 1/2 to 72	36 1/2	38 1/2
71 1/2 to 72	50 1/2	53	71 1/2 to 72	36 1/2	38 1/2	72 1/2 to 73	36 1/2	38 1/2
72 1/2 to 73	50 1/2	53	72 1/2 to 73	36 1/2	38 1/2	73 1/2 to 74	36 1/2	38 1/2
73 1/2 to 74	50 1/2	53	73 1/2 to 74	36 1/2	38 1/2	74 1/2 to 75	36 1/2	38 1/2
74 1/2 to 75	50 1/2	53	74 1/2 to 75	36 1/2	38 1/2	75 1/2 to 76	36 1/2	38 1/2
75 1/2 to 76	50 1/2	53	75 1/2 to 76	36 1/2	38 1/2	76 1/2 to 77	36 1/2	38 1/2
76 1/2 to 77	50 1/2	53	76 1/2 to 77	36 1/2	38 1/2	77 1/2 to 78	36 1/2	38 1/2
77 1/2 to 78	50 1/2	53	77 1/2 to 78	36 1/2	38 1/2	78 1/2 to 79	36 1/2	38 1/2
78 1/2 to 79	50 1/2	53	78 1/2 to 79	36 1/2	38 1/2	79 1/2 to 80	36 1/2	38 1/2
79 1/2 to 80	50 1/2	53	79 1/2 to 80	36 1/2	38 1/2	80 1/2 to 81	36 1/2	38 1/2
80 1/2 to 81	50 1/2	53	80 1/2 to 81	36 1/2	38 1/2	81 1/2 to 82	36 1/2	38 1/2
81 1/2 to 82	50 1/2	53	81 1/2 to 82	36 1/2	38 1/2	82 1/2 to 83	36 1/2	38 1/2
82 1/2 to 83	50 1/2	53	82 1/2 to 83	36 1/2	38 1/2	83 1/2 to 84	36 1/2	38 1/2
83 1/2 to 84	50 1/2	53	83 1/2 to 84	36 1/2	38 1/2	84 1/2 to 85	36 1/2	38 1/2
84 1/2 to 85	50 1/2	53	84 1/2 to 85	36 1/2	38 1/2	85 1/2 to 86	36 1/2	38 1/2
85 1/2 to 86	50 1/2	53	85 1/2 to 86	36 1/2	38 1/2	86 1/2 to 87	36 1/2	38 1/2
86 1/2 to 87	50 1/2	53	86 1/2 to 87	36 1/2	38 1/2	87 1/2 to 88	36 1/2	38 1/2
87 1/2 to 88	50 1/2	53	87 1/2 to 88	36 1/2	38 1/2	88 1/2 to 89	36 1/2	38 1/2
88 1/2 to 89	50 1/2	53	88 1/2 to 89	36 1/2	38 1/2	89 1/2 to 90	36 1/2	38 1/2
89 1/2 to 90	50 1/2	53	89 1/2 to 90	36 1/2	38 1/2	90 1/2 to 91	36 1/2	38 1/2
90 1/2 to 91	50 1/2	53	90 1/2 to 91	36 1/2	38 1/2	91 1/2 to 92	36 1/2	38 1/2
91 1/2 to 92	50 1/2	53	91 1/2 to 92	36 1/2	38 1/2	92 1/2 to 93	36 1/2	38 1/2
92 1/2 to 93	50 1/2	53	92 1/2 to 93	36 1/2	38 1/2	93 1/2 to 94	36 1/2	38 1/2
93 1/2 to 94	50 1/2	53	93 1/2 to 94	36 1/2	38 1/2	94 1/2 to 95	36 1/2	38 1/2
94 1/2 to 95	50 1/2	53	94 1/2 to 95	36 1/2	38 1/2	95 1/2 to 96	36 1/2	38 1/2
95 1/2 to 96	50 1/2	53	95 1/2 to 96	36 1/2	38 1/2	96 1/2 to 97	36 1/2	38 1/2
96 1/2 to 97	50 1/2	53	96 1/2 to 97	36 1/2	38 1/2	97 1/2 to 98	36 1/2	38 1/2
97 1/2 to 98	50 1/2	53	97 1/2 to 98	36 1/2	38 1/2	98 1/2 to 99	36 1/2	38 1/2
98 1/2 to 99	50 1/2	53	98 1/2 to 99	36 1/2	38 1/2	99 1/2 to 100	36 1/2	38 1/2
99 1/2 to 100	50 1/2	53	99 1/2 to 100	36 1/2	38 1/2			

PERSONAL

William J. Morris, for many years assistant treasurer Youngstown Sheet & Tube Co., Youngstown, Ohio, has been elected treasurer, succeeding Richard Garlick, resigned because of ill health. Mr. Garlick had been treasurer virtually since the formation of the company in 1900. He continues on the board of directors. For the past few years Mr. Morris has been practically acting treasurer. Walter E. Meub, secretary of the company and assistant to President James A. Campbell, was elected assistant treasurer. Mr. Garlick is now in the south with his family.

L. A. Lenhart, vice-president and general manager Youngstown Steel Car Co., Niles, Ohio, was added to the board of directors at the annual stockholders' meeting, Feb. 7. Other directors are: James A. Campbell, A. E. Adams, George F. Alderdice, R. E. Cornelius, U. C. DeFord, L. B. McKelvey, Porter Pollock, William Wilkoff, D. J. Wilkoff and L. C. Wilkoff.

Robert A. McDonald, for a number of years manager, Crescent Works, Crucible Steel Company of America, Pittsburgh, has been promoted to the position of general superintendent of all plants of the company, with headquarters in New York.

Charles Russ Richards, dean of the College of Engineering and director of the Experimental Engineering Department at the University of Illinois, has been elected president of Lehigh University, Bethlehem, Pa. Mr. Richards succeeds Dr. Henry S. Drinker, who retired more than a year ago to become president emeritus. Mr. Richards was born in Clarkshill, Ind., March 23, 1871. He received his bachelor's degree in mechanical engineering from Purdue University in 1890 and the following year his master's degree, continuing his post-graduate studies at Cornell University. For several years he was instructor of mechanical engineering at Colorado Agricultural College, in later years becoming associate dean of the Industrial College in charge of all engineering. In 1907 he was chosen dean of the College of Engineering. In 1909 he went to the University of Nebraska and in 1917 to University of Illinois.

Col. James Milliken has been elected president of the Pittsburgh Testing Laboratory, Pittsburgh, succeeding George H. Clapp, who remains with the organization as a member of the board of directors. Colonel Milliken, during the war, was assistant to S. M. Felton, of the Railroad Administration, and was active in the designing, construction and shipment of railroad equipment to France.

Bradley Stoughton, formerly secretary of the American Institute of Mining and Metallurgical Engineers, was elected president of the Yale Engineering Association at the annual meeting on Feb. 2.

Albert H. Whipple, superintendent of the Whitin Machine Works, Whitinsville, Mass., recently received a 50-year service pin from the company. Mr. Whipple entered the employ of the Whitin company in January, 1872, as an apprentice and has had an unbroken service record ever since.

Louis F. Vonier, Milwaukee, who resigned recently as sales engineer Federal Bridge & Structural Co., Waukesha, Wis., has been appointed district representative for Wisconsin of the National Pressed Steel Division, Central Steel Co., Massillon, Ohio, and has established headquarters at 412 Matthews Building, Milwaukee.

Frederick K. Vial, chief engineer Griffin Wheel Co., Chicago, and consulting engineer for the Association of Manufacturers of Chilled Car Wheels, will represent the last named organization at the convention of the International Railway Association at Milan, Italy, April 18 to 30. This will be the first meeting of the International Association to be held since 1910. This body

ordinarily convenes every five years, but the last meeting, which was scheduled to take place at Berlin in 1915, was abandoned for obvious reasons.

Herman A. Zannoth, Detroit, connected with the Cadillac Motor Car Co. of that city for the past nineteen years, has been appointed plant manager of the company's new works on Clark Avenue.

F. N. Arbaugh, of Lansing, Mich., has been elected president of the Auto Body Co., of Lansing, one of the largest companies of its kind in the Middle West.

Albert U. Widman has been made manager of manufacturing for the Cadillac Motor Car Co., Detroit, succeeding George H. Layng, resigned.

The American Spring & Mfg. Corporation, Holly, Mich., has elected C. J. Lane president. Other officers are: vice president, R. D. Tobin; secretary, treasurer and general manager, E. A. Hartz.

James F. Finneran, secretary and treasurer Northway Motors Corporation, Boston, has resigned. William W. Caswell takes his place. James F. Cavanagh has resigned as president to become chairman of the board of directors. Ralph E. Northway, formerly vice-president, has been made president and general manager.

F. M. Germane has been elected a director and vice-president of the Gilliam Mfg. Co., Canton, Ohio, and will have charge of the sales of the company's line of taper bearings. He was for many years associated with the former Standard Roller Bearing Co., Philadelphia.

D. W. Pratt of the Philadelphia office, the United States Cast Iron Pipe & Foundry Co., has been appointed sales agent in Kansas City territory at an office just established at 604 Interstate Building, Kansas City, Mo.

H. H. Hines has been appointed Toronto agent for the Consolidated Steel Corporation, succeeding Allan Hills, who has resigned.

Business in Refractories Restricted

PITTSBURGH, Feb. 13.—Purchases of refractories still are of a size sufficient only to meet actual requirements of buyers. There is absolutely no disposition on the part of the iron and steel industry to stock up at present and, indeed, there are numerous instances where the order is considerably smaller than the known needs of the purchaser. Fire clay brick seems to be finding a better sale than silica brick. No important change in prices is noted. Occasional instances come to light of Pennsylvania makers of fire clay brick going as low as \$30 per 1000, f.o.b. works, on high duty brick, and the claim is made by buyers that they have had quotations of \$28 per 1000, f.o.b. works, on Pennsylvania silica brick. These prices are about \$2 per 1000 below the general market quotation and in the case of fire clay brick it was stated that there being no close observance of standard specifications, some makers might offer as high duty grade, brick not coming quite up to standard.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	\$32.00 to \$35.00	\$30.00 to \$32.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick:		
Pennsylvania		30.00
Chicago		35.00 to 37.00
Birmingham		40.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore)		58.00
Chrome Brick:		
Standard size, per net ton		41.00 to 43.00

The Coxie Traveling Grate Co., Port Carbon, Pa., resumed operations on full time on Monday. The plant employs 200 men, who have been idle for about one month.

OBITUARY

GEORGE A. OHL, veteran machinery manufacturer, died at his home in East Orange, N. J., Feb. 8, in his eighty-fifth year. He retired from business activities in 1892 when he turned the business over to his son, George A. Ohl, Jr. Up to that time, he had taken out 52 patents on machinery of his own invention. He was born in Germany May 18, 1837, and came to this country when 15 years of age. He found employment in a locomotive works in Trenton and was also employed by the Newark Machine Co. and the Hewes & Phillips machine shops, Newark, N. J. Later he organized George A. Ohl & Co., of which his son, George A., Jr., is president and treasurer. His energies were devoted largely to making sheet metal machinery.

GEORGE W. BLAKE, president Buckeye Aluminum Co., Wooster, Ohio, died Feb. 6, following an operation for appendicitis, aged 36 years.

RICHARD HENRY RICE, manager Lynn Works General Electric Co., Lynn, Mass., died suddenly Feb. 10, at Bolton, Lake George, N. Y., where he had gone two days previously to recuperate from the shock of the sudden death of his son in Montreal. Mr. Rice was born in Rockland, Me., Jan. 9, 1863. His early education was obtained in that town. He graduated at the Stevens Technical School, Hoboken, N. J., as engineer, following which he was engaged in western railroad work and ship construction, latterly at Bath, Me. From Bath, Mr. Rice went to Providence, R. I., with the Providence Machine Works and subsequently became a member of the engineering firm of Rice & Sargent, that city. In 1903, he became associated with the turbine department, General Electric Co., Lynn, and in 1918 was made manager of the Lynn Works.

WILLIAM C. SARGENT, secretary Chain Belt Co., Milwaukee, died suddenly on Feb. 5 from heart trouble, at the age of 73 years. He was born in Troy, N. Y., and went to St. Paul, Minn. as a youth, entering the farm implement industry. In 1900 he, with the late C. W. LeValley, left St. Paul to go to Milwaukee, where they founded the Chain Belt Co.

WALTER READ, president and treasurer Filer & Stowell, Co., Milwaukee, died Feb. 10 after a brief illness with heart trouble. He was 66 years of age and resided in Milwaukee 59 years. He became associated with the Filer & Stowell Co., 45 years ago as an apprentice and afterward, with Thomas J. Neacy, became the principal owner.

CLARENCE J. CURRY, 39 years old, vice-president and general manager of the Smith & Davis Mfg. Co., manufacturer of iron bedsteads, St. Louis, was found dead in a room on the third floor of his home. It was believed that he was accidentally shot while cleaning an automatic pistol or a high-power rifle. Mr. Curry began work with the Smith & Davis Mfg. Co. as a boy of 18, gradually rising to an executive position upon the death in 1912 of his father, Clarence Edgar Curry, who was secretary and a heavy stockholder in the company.

BARTHOLOMEW TOOMEY, superintendent of the rolling mills of the American Car & Foundry Co., Detroit, died in that city, Jan. 29, at the age of 76.

ALBERT LEE BALDWIN, production manager and member of the board of directors, the Detroit Steel Products Co., Detroit, died at his home in that city on Jan. 30, following three weeks illness with pneumonia.

JOHN H. STREETER, secretary and treasurer Riverside Iron Works, Chicago, died on Jan. 26.

GEORGE W. PECK, manager of Miner & Peck Mfg. Co., Derby, Conn., manufacturer of drop presses, died Feb. 2.

WALTER D. OSBORNE, president of C. S. Osborne & Co., Harrison, N. J., manufacturer of tools, died Feb. 1, at Winter Park, Fla., where he had gone for his health. His death resulted from apoplexy. He was 65 years of age, and is survived by his wife and son.

WILLIAM S. FAIRHURST, proprietor of the American

Compressed Air Works, Brooklyn, died Feb. 3 at the Hahnemann Hospital, as the result of an operation.

ALBERT LEE BALDWIN, production manager and member of the board of directors of the Detroit Steel Products Co., of Detroit, died recently after a three weeks' illness. Mr. Baldwin joined the company in 1911 as an order clerk, and was advanced to a directorship in January, 1920. When the Fenestra Construction Co. was organized as a subsidiary of the Detroit Steel Products Co., he was made secretary.

E. R. ARMSTRONG, proprietor Wilcox Stove & Mfg. Co., Easton, Pa., was killed in an automobile accident, as was also Mrs. Armstrong, at a grade crossing near Miami, Fla., Thursday, Feb. 2.

Plant Operations in the Mahoning Valley

YOUNGSTOWN, Feb. 14.- Owing to accumulation of iron, the Sharon Steel Hoop Co., Sharon, Pa., has blown out its Mary blast furnace at Lowellville, Mahoning county, leaving 17 of 47 stacks active in the Mahoning and Shenango Valleys. This suspension eliminates a stack using beehive coke.

Production of the lighter steel products is holding up in the Youngstown district. In the Mahoning Valley, 33 of 51 independent open hearth furnaces are charged, while sheet mill capacity was scheduled at the beginning of the week at about 45 per cent, as compared with 39 per cent the previous week.

On the other hand, pipe production is sagging, eight of 17 pipe furnaces being fired. The Youngstown Sheet & Tube Co. has six tube mills in operation and the Republic Iron & Steel Co., three.

Blast furnace operation in the Mahoning Valley is being carried forward as follows: Carnegie Steel Co., 5; Sheet & Tube Co., 2; Brier Hill Steel Co., Republic Iron & Steel Co., A. M. Byers and Trumbull-Cliffs Furnace Co., one each.

The Republic company is operating its plate mill on skelp for pipe.

The Newton Steel Co., which has been running its 10-mill sheet plant at Newton Falls steadily for some time, has booked a sizable order for full finished sheets, placed by an automobile manufacturer.

Large Judgments Granted

Judgments aggregating \$721,580 were granted the Pittsburgh Tinsplate & Steel Corporation, Marietta, Ohio, against its ex-officers and directors and the brokerage firm of Goodman & Josephs, Cleveland, in a report filed Feb. 7, in the Franklin County Common Pleas Court, Columbus, Ohio, by Attorney Henry A. Williams, master commissioner. The company brought action for an accounting. In his report, Commissioner Williams declared that the Cleveland brokers received \$556,909.52 from the company under three commission contracts that were illegal. A finding in the same amount was made against Lakin C. Taylor, ex-president of the company, for permitting these brokerage contracts and also for \$116,802.09 for the receipt of which from the treasury of the company he failed to make satisfactory explanation to the master commissioner. Findings for the amounts paid the Cleveland brokers also were made against Curtis E. Waters, ex-treasurer, and John W. White, ex-secretary.

Lakin C. Taylor Sentenced to Penitentiary

Lakin C. Taylor, convicted several weeks ago in the criminal court in Pittsburgh on a conspiracy charge based upon the sale of stock in the Pittsburgh Tin Plate & Steel Corporation, was sentenced Feb. 10 to serve not less than 14 months nor more than two years in the Western Penitentiary of Pennsylvania. The maximum sentence allowed is two years. Taylor, who was president of the company, is alleged to have secured stock subscriptions by issuing prospectuses in which the condition and capacity of the company's plant at Marietta, Ohio, were exaggerated. Counsel for Taylor announced an appeal to the Superior Court would be taken at once.

IRON AND INDUSTRIAL STOCKS

Irregularity Noted in Quotations During the Past Week

Quotations for iron and industrial stocks the past week have been irregular. The strength of the common shares of United States Steel has been an outstanding feature. On the other hand, shares of those companies included in pending consolidations of steel properties have been weaker. No news is forthcoming to explain the strength of one and the weakness of the other. Quotations for industrial shares in general have moved up and down by turn, the net change for the week, on the average, not being worthy of special mention. At the moment the two outstanding constructive features in the business world are the strength of sterling exchange and of grain quotations. In both instances, greater buying power is indicated.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	44 3/4 - 45 1/4	Midvale Steel	29 5/8 - 31 1/4
Allis-Chalm. pf.	92 - 92 3/4	Nat. Acme	12 1/2 - 13 1/4
Am. Can. com.	36 3/4 - 38 3/8	Nat. E. & S. com.	39 - 43
Am. Can. pf.	96 - 96 1/2	Nat. E. & S. pf.	90
Am. C. & P. com.	116 3/4 - 118	N. Y. Air Brake	58 1/4 - 60
Am. Loco. com.	106 - 110 1/4	Nova Scotia Steel	25
Am. Loco. pf.	113 1/4 - 114 3/4	Pitts. Steel pf.	85
Am. Rad. com.	83 1/2 - 89 1/2	Press. Steel com.	65 1/2 - 67
Am. Sil. F. com.	32 - 33	Ry. S. Spg. com.	97 1/2 - 99
Am. Sil. F. pf.	91	Ry. S. Spg. pf.	112
Bald. Loco. com.	100 3/4 - 101 3/4	Replogle Steel.	29 1/2 - 32 1/2
Bald. Loco. pf.	106 1/4 - 107	Republic com.	51 1/2 - 54
Beth. Steel com.	57 - 58 3/4	Republic pf.	83 - 84
Beth. Steel Cl. R.	61 3/4 - 65	Sloss com.	10 - 41
Beth. Stl. 8% pf.	106 3/4 - 108 1/4	Trans. Williams.	33 1/2 - 34
Chic. Pneu. Tool.	62 3/4 - 66 1/4	Un. Alloy Steel.	26 - 28
Colorado Fuel.	26 1/2 - 27	U. S. Pipe com.	19 1/2 - 27 3/4
Cruc. Steel com.	60 3/4 - 63 3/4	U. S. Pipe pf.	59 - 64
Cruc. Steel pf.	80 1/2 - 82 1/4	U. S. Steel com.	84 1/4 - 89 3/4
Gen. Electric.	145 1/2 - 147 3/4	U. S. Steel pf.	116 - 116 1/4
Gl. No. Ore. Cert.	34 - 36 1/2	Vanadium Steel.	33 1/2 - 35 1/4
Gulf States Steel	70 1/4 - 77 1/2	Va. I. C. & C.	81 1/2 - 84 1/2
Int. Har. com.	83 - 86	Westhouse Elec.	52 1/4 - 53 3/4
Lack. Steel	46 3/4 - 49 1/4		

Trumbull Steel Co's Report

YOUNGSTOWN, Ohio, Feb. 14.—President Jonathan Warner of the Trumbull Steel Co. stated at the annual stockholders' meeting at the main offices in Warren last week that the company had received invitations to participate in merger negotiations, but had declined and was not a party to any such plans. He predicted gradual betterment in business conditions over the rest of the year, which, he said, would be reflected in the steel industry, though he looked for a period of little activity during the summer. Gross sales of \$12,851,000 last year compared with \$35,850,811 in 1920. The company reported a surplus account as of Dec. 31 last of \$7,784,000, a reduction from \$8,129,000 reported a year ago. The statement for the year showed a depreciation write-off against the plant of \$500,000 and inventory readjustment of \$750,000. The company produced 137,746 tons of finished steel, including 70,000 tons of tin plate last year, and shipped 136,711 tons. Shipments for 1920 aggregated 280,451 tons. The company reported operating profit for the year of \$260,000. The 1921 payroll of \$4,285,000 compares with a wage distribution of \$9,922,516 in 1920. There was a further set-up of \$250,000 against doubtful accounts, which the company expects to be 10 times more than necessary.

J. G. Brill Co. Report

The annual report to the stockholders of the J. G. Brill Co. says:

"For the year 1921 the combined output of your company's four plants amounted in sales value to \$7,647,895.56. The combined output of your company's plants for each of the past six years follows:

1916	\$6,180,895.79
1917	7,706,099.28
1918	16,761,154.95
1919	14,210,622.09
1920	17,537,293.13
1921	7,647,898.56

"After deducting from earnings the sum of \$370,453.93 for depreciation and the cost of all maintenance and repairs for the year, and after charging against earnings and reserves, set aside for this purpose, the sum of \$325,915.80 to cover depreciation in inventory values, the result, combined for the year, of the operation of all the plants of your company, shows a profit of \$163,399.96.

"While your company has been doing business in Canada for many years, it seemed desirable to extend its operations to that territory, and for this purpose a new company was formed known as Canadian Brill Co., Ltd., all the stock of

which is owned by your company, except the directors' qualifying shares. The new company has leased, with an option to purchase, a moderate size plant at Preston, Ont., which was put in operation Sept. 1, 1921, and now has sufficient work to keep it running at its full capacity."

Industrial Finance

The Norwalk Iron Works Co., Norwalk, Conn. has filed a preliminary certificate of dissolution. All claims should be sent to A. Raymond Betts, care of the company, South Norwalk.

The Winchester Repeating Arms Co., New Haven, Conn. has issued 90,000 shares of heretofore unissued authorized capital stock, thereby bringing the outstanding capital up to \$10,000,000.

The 1921 net earnings, after federal taxes, depreciation and reserves, of the Sullivan Machinery Co., Chicago and Claremont, N. H., were \$512,488, equivalent to \$3.25 a share on its 157,803 no par shares outstanding. In 1920, the net earnings were \$1,347,315, or \$8.69 a share on 155,118 shares. At the close of 1921, the company had current liabilities of \$1,037,242, and current assets of \$7,829,124, leaving a net working capital of \$6,791,882.

At the annual meeting of the Greenfield Tap & Die Corporation, Greenfield, Mass., held recently, it was announced 1921 results would not be available until March. Incoming orders for January, 1922, were more than 50 per cent larger than those for the corresponding month last year. The company is employing 600, contrasted with 1500 fifteen months ago.

The Pittsburgh Steel Co reports gross earnings for the six months ended Dec. 31, 1921, at \$6,609,876, against \$18,077,585 in the same period in 1920 and net profits of \$242,033, against \$1,769,700 in the last six months of 1920.

Trade Changes

Maxwell Spiro, formerly district manager of the New York office of Briggs & Turivas, operators in iron and steel scrap, is now connected with the Merchants' Metals Corporation, Woolworth Building, in the capacity of general manager. The Merchants Metals Corporation deals in iron and steel and machinery, and it is intended to develop the scrap iron department of the corporation. Mr. Spiro, prior to his service with Briggs & Turivas, was a commanding officer of a motor transport company in the U. S. Army in France during the World War. He was also connected with the engineering staff of the Baldwin Locomotive Works at Burnham, Pa.

The American Foreign Steel Co., Grand Central Terminal Building, New York, which has been liquidating its affairs in the past two months, has just sold its iron and steel scrap yard at Lackawanna, New York, to the Joseph Schonthal Co., Columbus, Ohio, which operates scrap yards at Columbus, Huntington, W. Va., Detroit and Cleveland. Joseph Neeb, general manager of the Lackawanna plant of the American Foreign Steel Co., has been retained in the same position by the purchasing concern.

L. D. Adams has opened an office at 204 Seltz Building, Syracuse, N. Y., as manufacturers' agent (not a jobber) for foundry equipment and supplies. He will also represent the E. Reed Burns Mfg. Corporation with platers and polishers supplies in New York State, outside of the Metropolitan District. For the past three years Mr. Adams has been salesman for the S. Obermayer Co. through the east.

D. E. Hadley, S. H. Baird and John F. Kevern, all formerly connected with the Sly Mfg. Co. in sales and engineering capacities, have just organized the Mutual Equipment Co., 251 Fort Washington Avenue, New York, to bring out modern and improved sand blast equipment, dust arresters, core ovens, tumbling mills, and special machinery to meet the requirements of the foundry trade.

The Max Amis Machine Co., New York, announces that on Feb. 1 it opened an office in Rochester, N. Y., at 705 Commerce Building. H. S. Freeman who was the Western representative of the company, has charge of the Rochester office. J. J. La Cava has been appointed western representative at the company's new Chicago office, 20 East Jackson Boulevard.

The general offices of the Superior Steel Corporation have been removed from the Union Arcade Building, Pittsburgh, to the works of the company at Carnegie, Pa. The company, however, retains sales offices in the Union Arcade Building.

The Standard Sanitary Mfg. Co. regular quarterly of 1% per cent on preferred stock and 2 per cent on common stock, both payable Feb. 15, to stock of record Feb. 7.

The A. C. Warner Co., Philadelphia and Baltimore, is now representing the Dow Co., Louisville, Ky., designing and supplying conveyors.

PIG IRON MAY BE EXPORTED

**American Price Decline Favoring Sales to Europe
—Ore Imports—Foreign Buying Largely
Governmental**

NEW YORK, Feb. 14.—Foreign buying continues, but is almost entirely confined to Japan, with sporadic inquiring from other Far Eastern markets. A large part of the Japanese buying is either by the Imperial Government or municipalities. Black sheet business has dwindled to a few scattered orders, but there is a noticeable activity in blue annealed sheets in small lots. The recent inquiry of a large Japanese oil company for 20,000 base boxes of oil can tin plate has been placed in the United States and will probably go to the leading interest. The government call for bids on about 8000 tons of structural material for two bridges, issued some time ago, is also understood to have been placed in this country with an exporter, who submitted the quotations of one of the largest independents.

The Imperial Government Railways, beside the 10,000 tons of rails now being bid upon, has purchased several hundred tons of steel for the construction of light locomotives. Among inquiries still open is a tonnage of light rails (about 18-lb.) and 300 tons of 15-in. steel beams. The Taiwan Electric Power Co., Formosa, which has purchased electric equipment and pipe in the United States, has placed a part of the 225 miles of steel transmission towers required with a Japanese export house in New York.

British sheet mills are at present strong competitors in Japan, but the gradual rise of the pound sterling toward parity is expected to mark an increase in sales of the American product. The increase in European exchange is affecting imports and purchases for shipment to other markets. The German fuel shortage and its consequent effect upon pig iron prices and production, coupled with the rise in foreign exchange of the Belgian franc, has placed Belgian iron upon too high a price basis for importation into the United States, excepting, as has been the rule for some time, to the Pacific coast. Even in this market transactions are diminishing as values increase. Belgian foundry iron, which a few weeks ago with the franc quoted at about 7c., could be landed c.i.f. Atlantic port at 300 fr. per ton (about \$21), now costs about \$24.57 per ton with the Belgian franc at 8.19c. in exchange.

In view of the rise in Continental prices and exchange and the decline in American prices on pig iron, one importer and exporter of pig iron and semi-finished material believes that should this condition continue, it will be possible before long to export pig iron to European consumers. In fact, with foundry iron quoted at \$15.50 to \$16 per ton, Birmingham, this exporter claims that he could consummate sales now, were it not for the freight rate from Birmingham to a port abroad.

Foreign ores are in a much better position in the American market than foreign pig iron. Ore imports are not only possible but Eastern furnaces show a strong inclination to negotiate for their purchase. A trial cargo of North African low phosphorus ore, from Algiers, analyzing about 50 per cent iron, raw, and 57 per cent, dry, has been shipped to a Pennsylvania furnace. Should this ore prove satisfactory, a contract for continued shipments will probably be made with the importer. Ore of this analysis can now be delivered, c.i.f., Atlantic port at about 10½c. per unit.

Practically the only manganese ore, except Indian, that it is now possible to import is Brazilian, on which contracts have recently been made at 22c. per unit. Caucasian manganese ores from Poti, Georgia, are not only reported to be uncertain as to quality, but are now quoted at 25c. per unit, c.i.f. Atlantic ports. The situation at these mines is said to be steadily improving since the organization of an association of the government and the producers, but rail connections do not permit of shipments from mines to port and current shipments are practically all from stock.

The list of electrification projects in various foreign markets continues to grow. According to the Bureau

of Foreign and Domestic Commerce, a company has been organized at Utsunomiya, Japan, to construct a high speed electric railroad between Nikko and Tokio, at an estimated cost of 10,000,000 yen (about \$4,725,000). German competition in the Far East on electrical material is reported to be keen. Highly satisfactory credit arrangements appeal to Chinese buyers particularly. The German Siemens-Schuckert Co., has combined with Chinese interests to erect an electrical manufacturing plant at Soochan and with the Furukawa Electro-Industrial Co. in Japan to erect a plant for the manufacturing of small electric meters.

Stocks of Coal Increasing

WASHINGTON, Feb. 14.—Warnings of Government officials to industries of the country to lay in stocks of coal on account of the threatened strike of union bituminous and anthracite miners on April 1, are bearing fruit. It is evident that stocks are being added to and as indicative of this is the fact that production of both grades of fuel is increasing, according to the report of the United States Geological Survey. The total output of bituminous coal, including a small amount of lignite, during the week ended Feb. 4, is estimated at 9,708,000 net tons. In comparison with the week preceding, this was an increase of 88,000 tons, and in comparison with the corresponding period a year ago, the increase was 1,576,000 tons. The present production is declared to be large enough to meet current requirements for consumption and export, and at the same time add to the reservation in storage. Stocks of bituminous coal on Jan. 1, consisted of 47,500,000 tons in the hands of consumers, and 7,151,000 tons on the upper lake docks.

The stocks at steel works were sufficient to last 48 days and those at coal plants were sufficient to last 42 days.

Nearly a million tons of by-product coke, according to the Survey, is on hand at coke plants, much of which can be used for domestic fuel. While production of anthracite coal increased in the first week of February, and amounted to approximately 1,811,000 net tons, it is declared that the reserve in storage and in transit has probably decreased because production in January was not enough to meet estimated current consumption. But since then its report indicates greater stocks.

Nine Years Without a Strike

A record of nine years' operation of plants without a strike is one of the achievements noted by Simon Guggenheim, president of the American Smelting & Refining Co., in a general report on improvement in industrial relations between the company and its employees, which has just been issued for the information of stockholders.

The report indicates that as a result of the company's policies in its relationships with its working forces, only a couple of minor differences intervened since 1913, and these incidents were practically repudiated by the employees.

President Guggenheim shows that the company early adopted an 8-hr. day, was a pioneer in establishing a system of pensions and indemnities, and employees' committees for co-operation in plant operation, together with other features aimed to promote harmony and efficiency.

Blast Furnace Activities

The Mary furnace, Sharon Steel Hoop Co., Lowellville, Ohio, was blown out Feb. 11, after a run of eight months. The furnace, which has a capacity of 12,000 tons a month, has been producing from 3500 to 4000 tons a month more iron than the company has been charging and the accumulation is sufficient to carry the company along for several months at the present rate of consumption. This leaves only 16 of the 47 blast furnaces in the Mahoning and Shenango valleys in blast. Preparations are being made to start up the Dover furnace, Dover, Ohio, during the week of Feb. 16. This is a Hanna Furnace Co. stack.

EXPECTS IMPROVEMENT

President Campbell Looks for Gradual Change— Discusses Proposed Consolidations

YOUNGSTOWN, OHIO, Feb. 14.—“At the present time the outlook for profitable business during the year is not good,” President James A. Campbell of the Youngstown Sheet & Tube Co. told stockholders to-day at the annual meeting. “I am of the opinion that the first half of the year will be unprofitable, because of the small volume of business and the very low prices prevailing. There are, however, many hopeful signs of future improvement, which in my judgment bid fair to make for better conditions. The most hopeful of these are the success of the Arms Limitation Conference recently held in Washington, the arrangement between Great Britain and France, by which Great Britain agrees to assist France in case of invasion by any other power, which marks, in my opinion, the end of deterioration and the beginning of reconstruction in Europe, and the proposed financial conference at Genoa, which gives hope for the solution of some of the serious financial problems of Europe and the stabilization of exchange.

“With these things accomplished, taxes should be greatly reduced, disorder in Russia and the Balkan States should rapidly diminish, and order be restored in Europe. I think that few of us fully realize the vast importance of the events that have taken place during the last 60 days, or their probable influence on the peace of the world, the reduction of Government expenditures, and the business situation both here and abroad.

President Harding's Policies

“In our own country the President is thoroughly impressed with the importance of liquidation of labor and material values where this has not fully taken place, realizing that such liquidation is necessary to reduce the cost of living. He has already taken steps that have lowered freight rates in some instances and will bring about further reduction in the near future. He has also taken steps to prevent profiteering and assure to the consumer the benefit which should result from lower production costs, which are in many cases now absorbed by middlemen and are, therefore, not reflected in retail prices.

“It takes time to accomplish all of these things, but I am convinced that by the middle of the present year the combined results of all of them will restore confidence and make for greater business stability. I am, therefore, in hopes that the last half of the year will bring us a greater volume of business and perhaps a small margin of profit.

Discussing the past year, he said: “In volume of business, in shrinkage in value of inventories, and in earnings, the year 1921 was the poorest year in the history of your company. The actual amount charged off for this reduction in value of stocks was less than in some other years, but we absorbed a considerable amount of this loss in our costs during the year which does not show in this charge.

Reduction of Wages

“On Feb. 16, 1921, we reduced the wages of all employees about 20 per cent. On July 1 we abandoned the 8-hr. basic day, which discontinued paying time and a half for all time over 8 hr. On August 16 we made a further reduction of about 20 per cent in the wages of all labor. These reductions combined reduced common labor from 16c to 30c per hour, the present rate. Steel plants in the East are now paying from 20c to 25c per hour for common labor, and in Buffalo the rate paid is 23c per hour. We should dislike very much to further reduce wages, because we believe that employees in the steel industry have already suffered greater reduction of wages than those in most other lines, and we do not believe that the cost of living has declined sufficiently to justify it. We are not willing, however, to dissipate our capital in meeting conditions as we find them to day, by selling our products at less than cost. There is a very serious question involved as to whether we should give the men more employment at

a lesser wage by trying to meet conditions as we find them, or close down those departments which are operating at too great a loss.

“The steel industry, in its anxiety for business, has tried to name prices during the past year to meet the ideas of the consumer. The published statements of most of the steel companies for this year show considerable loss. Some of this is due to shrinkage in value of inventories with which labor has nothing to do, but a large percentage of it has been lost in operation of plants.

Reducing Expenses

“We have reduced our overhead expenses during the year to the very minimum by eliminating employees in every department where it was possible to do so, and also by reducing the salaries of officials, superintendents and men holding important positions.

“Relations with employees during the year have been very harmonious and we believe that this is due in a great measure to our representation plan. Representatives and their committees meet at stated times and discuss any questions pertaining to operation or working conditions, and they are usually settled to the satisfaction of all concerned. We believe that there is closer contact between the management and the men than heretofore, which leads to a better mutual understanding.

Proposed Mergers

“You have probably read much in the public press with reference to proposed combinations in the steel industry, in which your company has been mentioned. There has been considerable discussion on this subject during the past year among executives of different steel companies, who have hoped that such combinations would make it possible to reduce cost and improve the distribution of their products, owing to the different geographical locations of the plants under consideration.

“We have attended the conferences held and have had valuations of our properties made, with a view to joining in the proposed consolidation of interests when we are convinced that we can do so without impairing your position. You can rest assured that we will not make any recommendation to the stockholders with reference to these combinations until we are thoroughly convinced, after careful consideration, that your interests will be better served by joining with other companies.”

The company's financial statement for 1921 shows:

Earnings from operations including miscellaneous income, less after deducting repair and maintenance expense, special charges and reserve for general taxes \$3,875,011.60. Less provision for depreciation of plants and equipment \$1,119,110.72. Provision for exhaustion of coal properties \$26,845.79. Reduction in value of inventory to cost of market at Dec. 31, 1921 \$2,191,797. Net loss for year \$19,899.71. Dividends paid on preferred stock \$69,101 on common stock \$1,935,770. Deficit for year \$2,714,024.14. Gross sales of the Sheet & Tube company and its subsidiary properties were \$39,271,907.77. Gross receipts of the parent company including pig iron, coke, by products, etc. \$2,991,119.48. Payroll for year \$10,101,667.97. Shipments of finished and semi-finished iron and steel products 367,410 tons.

Cutting fluids is the subject of technologic paper No. 204 of the Bureau of Standards soon to be issued. The difficulties attending the proper lubrication of the cutting tool in machine work and the reason why lard oil is particularly suitable are discussed. Part 2, dealing with actual practice, will consider the correspondence which the bureau conducted with many large machine shops as to their experience with cutting fluids. The bulletin, when ready, may be had from the superintendent of Documents, United States Printing Office, Washington, at 15 cents per copy.

Z. I. Sault, Boston, delivered an address on heat treating before the Boston chapter American Society of Steel Treathers at the City Club, Boston, Feb. 10. His address took the form of a practical discussion of experiences in the treatment of steels during heating, and methods employed in overcoming defects.

Machinery Markets and News of the Works

MORE INQUIRIES ISSUED

General Electric Co., Lynn., Mass., in Market for Considerable Equipment

Trade Is Disappointed, However, That So Few Inquiries Result in Buying

Inquiries for machine tools continue to come out in fairly encouraging volume, but the trade is still disappointed in the small number of orders being placed. Whether the greater interest that prospective buyers appear to be taking in new equipment betokens a larger measure of buying this spring is a question for which machine-tool manufacturers have found no answer.

Some of the inquiries now pending are of fairly good size, as for example, one from the General Electric Co.,

Lynn., Mass., for 42 machines for an experimental laboratory and another list from the same company for about 30 tools for its Gloucester, Mass., works.

Railroad buying is very limited, but a few inquiries are being quoted on. The Nickel Plate has issued at Cleveland an inquiry for about a dozen tools and the New York Central Lines west of Buffalo want five machines.

Some business continues to come from the automobile manufacturers and there is quite a little under negotiation. A Michigan manufacturer has bought seven turret machines. The Ford Motor Co. is expected to close shortly on two planers.

Good used tools are in demand. A Cincinnati valve manufacturer bought about 10 used machines and two orders each for \$10,000 worth of used tools have been received by Cincinnati dealers from Louisville manufacturers.

New York

New York, Feb. 14

No signs of improvement in the machine-tool trade in this district are apparent. A large machine-tool company doing a national business reports that it is receiving more inquiries, but most of these come from sections of the country other than the New York territory. Locally, both orders and inquiries are at low ebb. Sellers of tools have very few live prospects to work upon and everyone in the trade seems at a loss to predict when there will be an improvement. There is disappointment over the slowness of the railroads to buy, and it is admitted that little may be expected from this quarter until a decision has been reached at Washington in the matter of freight rates.

Although few closings on either electric or hand power cranes are reported for the past week, inquiries continue to pile up. Increased activity is noted in electric hoists. One fair sized export inquiry appeared during the week from New York exporters. All bids are in on the two 10-ton, 90-ft. span overhead travelling cranes inquired for by the American Car & Foundry Co., for Huntington, W. Va. The Kelsey Motor Co., Newark, N. J., is interested in quotations on monorail hoists (electric) and will later purchase a 5-ton electric overhead crane. The Wallingford Steel Co., Wallingford, Conn., which issued an inquiry several weeks ago for a 15-ton and 3-ton, overhead travelling crane, is reported to have purchased. The L. B. Foster Co., 154 Nassau Street, New York, has asked for prices on a 20-ton, used locomotive crane. The electric cranes for the Narragansett Electric Light & Power Co., Providence, R. I., will probably consist of two 10-ton and three 1-ton electric cranes.

Among recent sales were: Shepard Electric Crane & Hoist Co., two 3-ton and one 7½-ton electric hoists to the American Circular Loom Co., Kenilworth, N. J.; Whiting Corporation, a 5-ton, 58-ft. span overhead travelling crane to the Lamson Co., Boston, Mass.; H. D. Conkey & Co. a 5-ton, single I beam hand power crane to the General Engineering & Management Corporation, 141 Broadway, New York.

The Remington Arms & Ammunition Co., 25 Broadway, New York, is perfecting plans for the conversion of a part of its former munition plants to manufacture cash registers and parts, and will establish headquarters for this branch of the business at 13 East Forty-second Street.

The Perfect Brick & Hollow Tile Co., Brooklyn, care of Silverstein & Infanger, 188 Montague Street, architects, is taking bids for the erection of a one-story plant at Grand Street and Newtown Creek, 100 x 100 ft., estimated to cost about \$50,000, including machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until Feb. 25, for a large quantity

of miscellaneous tool steel for use at the Brooklyn Navy Yard and other navy yards.

The Consolidation Coal Co., 67 Wall Street, New York, has disposed of a bond issue of \$10,000,000, the proceeds to be used for the purchase of the properties of the Carter Coal Co., in the Pocahontas field, W. Va., and other properties, and for the installation of tipples, electrical and mechanical equipment, etc. C. W. Watson is president.

The Aeromarine Plane & Motor Co., Locust Street, Keyport, N. J., is arranging for increased production with additional working force, to manufacture 25 Martin-type airplane bombers for the War Department, Washington. The order approximates \$500,000. Paul G. Zimmermann is engineer.

The Jefferson Co., 732 Jefferson Street, Hoboken, N. J., is making inquiries for a 200-hp boiler, with 100-kw., 220 volt generator.

The Kelsey Motor Co., 25 Branford Place, Newark, N. J., will install machinery at once in the first unit of its new plant on Washington Avenue, Belleville, N. J., comprising about 34,000 sq. ft. of space. A portion of the works will be used for the manufacture of power transmission equipment for the Kelsey friction drive unit, and the remainder for assembling. E. B. Slade is president; and C. W. Kelsey, general manager.

The Solar Electric Mfg. Co., Newark, has been organized with a capital of \$100,000 to operate a plant at 24 Mechanic Street, Newark, recently leased in the name of the Solar Light Co., 69 Wooster Street, New York. It will manufacture high-power electric lamps and kindred products. Charles E. Gluckman and Joseph Blum head the company.

Refrigerating machinery to cost about \$122,000, will be installed in the new municipal market building, now being erected by the Department of Parks and Public Property, City Hall, Newark, N. J., and which complete, will cost in excess of \$1,000,000. An electric light and power house also is being planned, estimated to cost \$117,000. Charles P. Gillen is director of the department. George B. Hooper and Frank Grad, 245 Springfield Avenue, are associated architects.

Philadelphia

PHILADELPHIA, Feb. 13.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, is arranging for an increase in capital from \$60,000,000 to \$150,000,000, a large part of the proceeds to be used for extensions and improvements in generating plants and system. It is planned to install a new 20,000-kw. turbo-generator at the power house at Beach and Palmer streets, and to build an entire new plant unit at this location with like output. Extensions will be made

In the power plant at Christian street and the Schuylkill River, and new equipment installed.

Motors and other electric power equipment will be installed in the three-story printing plant, 120 x 180 ft., to be erected at Sanson and Seventh streets, Philadelphia, by the Curtis Publishing Co., estimated to cost about \$200,000. C. Roberts & Co., Real Estate Trust Building, are engineers.

The Bath Portland Cement Co., Finance Building, Philadelphia, will take bids at once for a new cement plant on property acquired at Sandis Eddy, Northampton County. It will comprise a power plant, machine shop, etc., and is estimated to cost \$1,750,000. The company has also arranged an appropriation of \$300,000 for extensions in the electrical and operating departments at its plant at Bath, Pa. It is planned to completely electrify this works. Louis Rafetto is president, and John Barnes, treasurer.

The Bureau of Water, City Hall, Philadelphia, will soon call for bids for the construction of a one-story electrically operated pumping plant at the Lower Roxborough waterworks, Eva Street and Shawmont Avenue.

The Standard Sanitary Mfg. Co., Hessemer Building, Pittsburgh, has leased a building to be erected at Glenwood Avenue and Oxford Street, Philadelphia, for a local branch.

The Frick Co., Waynesboro, Pa., manufacturer of agricultural machinery, tractors, etc., has awarded contract to A. E. Warner, 41 East Main Street, for a one-story shop addition, 50 x 100 ft., for engine work and assembling. A. O. Frick is vice-president and general manager.

The Pennsylvania Edison Co., Easton, Pa., a subsidiary of the General Gas & Electric Co., operated by W. S. Barstow & Co., 50 Pine Street, New York, will commence the immediate erection of an addition to its electric generating plant, to include the installation of a 10,000-kw. steam turbo-generator and auxiliary equipment, estimated to cost about \$800,000.

Following the complete electrification of its local properties, the Jamison Coal & Coke Co., Greensburg, Pa., will proceed with similar installations at its properties in the Fairmont, W. Va., field. Plans have been completed for the electrification of the No. 9 mine at Farmington, W. Va.

The Queens Run Fire Brick Co., Lock Haven, Pa., has taken over the North Branch Fire Brick Co. and the West Branch Fire Brick Co., both operating plants in the section, and will consolidate the companies under its present name. A number of improvements will be made. William Slescher is president, and George H. Black, general manager.

The Wyoming Valley Water Co., Hazleton, Pa., will install electrical equipment at its pumping plant for light and power service at Hudsonale and vicinity. John T. Scanlon is superintendent.

H. A. Feering, Bethlehem, Pa., care of Howard J. Wiegner, Bethlehem Trust Building, architect, will soon take bids for a three-story automobile service and repair works, 60 x 100 ft., estimated to cost \$45,000.

A vocational department will be installed in the new high school to be erected at Doylestown, Pa., estimated to cost about \$75,000, plans for which have just been ordered prepared.

Fire, Feb. 5, destroyed the sheet metal shop of the Philadelphia & Reading Railroad Co., Reading, Pa. The exact amount of loss has not been announced, but is reported as considerable, including building and equipment.

The Gelsinger Garage, C. S. Gelsinger, 3323 Derry Street, Harrisburg, Pa., head, will soon commence the erection of a new one-story and basement automobile service and repair works, 60 x 100 ft., at Twenty-eighth and Main streets, Penbrook, Pa.

The Gurney Electric Elevator Co., Honesdale, Pa., manufacturer of elevators, hoists, etc., has abandoned plans for the removal of its works to another location and operations will be continued at the present plant. A bond issue of \$300,000 has been sold, a portion of the proceeds to be used for extensions and improvements.

The Board of Education, Easton School District, Easton, Pa., has commissioned William H. Michler, Drake Building, and John Shav, Easton Trust Building, architects, to prepare plans for a two-story and basement high school, 65 x 230 ft., to include vocational department, and estimated to cost about \$350,000.

The Traylor Engineering & Mfg. Co., Allentown, Pa., will devote a portion of its plant to the manufacture of a special type of steel spring. Production has been under way on this specialty at the Cornwells plant of the company, and the full capacity of this works will be used for this line of manufacture, in addition to the steel spring output to be developed at the Allentown plant.

A vocational department will be installed in the new high school to be erected at Nazareth, Pa., estimated to cost \$100,000.

Electric motors, ranging from 500 to 300-hp., and smaller, and other electrical equipment will be installed for coal breaker operation at the new plant of the Lehigh Coal & Navigation Co., at Coaldale, near Lansford, replacing a plant destroyed by fire. It will cost about \$1,000,000 with machinery.

Chicago

CHICAGO, Feb. 13.

The tendency toward expansion in business noticeable in January has not been sustained and the current market is exceedingly quiet. Inquiries are fewer and orders are almost nil. The railroads have bought nothing against their lists, but the Santa Fe has added two more items to its outstanding inquiry as follows: One lathe for piston work with 36-in. swing and 9 ft. between centers, arranged for direct current motor drive, and one double-end punch and shear with 8-in. throat, capable of punching a 4-in. hole in a 2-in. plate, and shearing 12 x 2½-in. flats and 4½-in. rounds and splitting 1½-in. plate, arranged for direct current motor drive. The only new inquiry of importance comes from the Board of Education, Hammond, Ind., and calls for 10 engine lathes, one milling machine, one sensitive drill, one arbor press, one 12-in. crank shaper, one hack saw, one grinding machine, and a sliding-head drilling machine. Here and there a few sales of individual machines are being made, as for example, a sale of a 20-in. crank shaper to the Brunswick-Balk-Collender Co., for its Muskegon, Mich., plant. The crane market is inactive.

The Donahue Steel Products Co., People's Gas Building, Chicago, has sold to the Seyler Mfg. Co., Pittsburgh, the following machinery from its Chicago stock: A 1½-in. Acme upsetting and forging machine, a Pawtucket shear for bolt stock, a No. 2 Williams-White eye bender, a No. 4 Williams-White bulldozer, and a three-spindle Landis threading machine.

The Cyclone Motors Co., a new company organized to manufacture motorcycles, will locate at Benton Harbor, Mich. The head of the company is John M. Eaton, Detroit, for 15 years associated with Henry M. Leland, the Detroit automobile manufacturer. The company has entered a contract to buy the plant of the Peninsula Lumber Co., Benton Harbor. While it will specialize in the manufacture of delivery cars of the motorcycle type, it will also make a three-passenger automobile. Remodeling of the Peninsula plant is to commence at once.

The Damascus Steel Products Corporation, recently incorporated to manufacture tools, will open a factory on Fourteenth Avenue, Rockford, Ill., where it has leased floor space, and is now installing equipment. The company has \$50,000 capital stock.

The United Light & Power System, Abilene, Kan., has purchased the Williamson power plant and dam on Republican River at Clay Center, Kan., and will improve the property.

The W. T. Safety Tool Co., Taylorville, Ill., was recently incorporated to market tools, on which it has patents, for use on high-tension electric transmission lines, these tools being intended to make all repairs of lines without interruption in the service. The company will not build a plant for the present for the reason that its president operates a machine shop, and part of its products will be made there, while the remainder will be let out on contracts. The officers are C. R. Wood, president; M. T. Tipsord, vice-president; W. D. Williams, secretary-treasurer.

The Pacific Malleable Iron Co. has been incorporated with \$50,000 capital stock at Gresham, Ore. A \$10,000 foundry will be constructed on a site which has already been purchased. M. Moga is the head of the company.

The Wisconsin Steel Works, 106th Street and Torrence Avenue, Chicago, has let contract for a one-story electric station, 29 x 52 and 16 x 52 ft., to cost \$10,000.

The Oetting Ice & Coal Co., 1725 West Fifteenth Street, Chicago, has let a contract for a one and two-story ice manufacturing plant to cost \$35,000.

C. A. Esser, architect, 38 South Dearborn Street, Chicago, is receiving bids on a three-story factory and boiler house, 80 x 214 ft., to be equipped with high-pressure boiler, for the Gurinlan Candy Co., St. Joseph, Mich. It will cost \$75,000.

The Hug Co., Highland, Ill., has been incorporated with \$100,000 capital stock to manufacture road building equipment. It is constructing a one and two-story plant, 36 x 300 ft., and has purchased most of the machinery required. C. J. Hug is president and general manager.

The National Stamping & Electric Works, 426 South Clinton Street, Chicago, has let contract for an addition to its plant at 3235-50 West Lake Street, 186 x 118 ft., to cost \$20,000. It manufactures electrical household appliances.

The Edward Katsinger Co., manufacturer of machinery and machinery, 910 West Washington Boulevard, Chicago, will build an additional unit to its plant, 332 x 599 ft., at Armitage and Cicero avenues.

A deed was recently filed in the probate court at Edwardsville, Ill., calling for the transfer of a tract of land in the south extension of Granite City, Ill., to the American Locomotive Co. This is another step toward the proposed location of a large plant in the St. Louis district by the locomotive company.

The Union Utilities Co., Rutland, Iowa, has plans under way for a new hydroelectric generating plant to cost about \$150,000. Toltz, King & Day, 1410 Pioneer Building, St. Paul, Minn., are engineers.

A vocational department will be installed in the three-story high school, 101 x 162 ft., to be erected at Fremont, Neb., bids for which are being received until Feb. 20. Equipment bids will be taken later. It is estimated to cost \$200,000. The A. H. Dyer Co. is architect. James A. Donahue is secretary of the board.

The Northwestern Paper Co., Cloquet, Minn., has plans under way for a new three-story pulp and paper mill, estimated to cost \$500,000, including machinery. George F. Hardy, 309 Broadway, New York, is engineer. C. I. McNair is general manager.

C. R. Berglund, 2630 Wentworth Avenue, Chicago, is taking bids for a new one-story plant, 100 x 125 ft., at South Park Avenue and Sixty-seventh Street, to manufacture automobile bodies. A. G. Lund, 449 West Sixty-third Street, is architect.

A vocational department will be installed in the new Theodore Roosevelt high school to be erected at Des Moines, Iowa, to cost in excess of \$1,000,000. Bids for the building have been taken and contract will soon be let. Bird & Rawson, 810 Hubbell Building, are architects. George I. Garton is secretary of the board.

The Arkansas Valley Railway, Light & Power Co., Pueblo, Colo., has construction under way on a new power plant, and plans the installation of generating and other equipment at an early date.

Jacobson Brothers, 410 Columbia Building, Duluth, Minn., have completed plans for the erection of one-story automobile service and repair building, 75 x 140 ft., estimated to cost about \$100,000, including equipment. Halstead & Sullivan, 409 Palladio Building, are architects and engineers.

Baltimore

BALTIMORE, Feb. 13

Slaysman & Co., Pratt and President streets, Baltimore, machinists, will install a number of machine tools at their works, including drilling and milling machines.

A filtration plant to cost about \$1,200,000 will be erected by the Water Board, City Hall, Baltimore, at Montebello. It will include pumping plant with electrically operated machinery, settling basins, filtering equipment, etc. Plans are being drawn. William A. Megraw is water engineer.

The Chicago Nipple Mfg. Co., Richmond, Va., manufacturer of oil well machinery, nipples, fittings, etc., is planning for the establishment of a new factory at Baltimore and is negotiating with the local Merchants' & Manufacturers' Association for a building to approximate about 25,000 sq. ft. of floor space. It is planned to remove the Richmond works to the new location. Dixon C. Williams is president.

The property of the National Ship Supply & Machinery Co., Sollers Point, Baltimore, will be offered for sale Feb. 28-March 2, inclusive, including buildings, machinery, etc.

The Town Commission, Littleton, N. C., has completed plans for a municipal electric light and power plant and will commence work at an early date. The J. B. McCrary Engineering Corporation, Atlanta, Ga., is engineer. H. C. Smith is town clerk.

The Wilson Motor Co., High Point, N. C., will take bids in the spring for a three-story repair and service building, 75 x 100 ft., on property recently acquired, estimated to cost about \$75,000.

The Thomasville Variety Works, Thomasville, Ga., is planning to rebuild its woodworking factory, recently destroyed by fire with loss estimated in excess of \$100,000, including machinery. K. E. Mack heads the company.

Freight handling and conveying machinery, hoisting equipment, etc., will be installed by the Port Commission, Norfolk, Va., at the new docks and warehouses to be erected at Sewells Point, bids for which will be asked early in March. Neff & Thompson, Seaboard Bank Building, are architects. The Potwell-Ahlstrom Co., 332 South Michigan Avenue, Chicago, is engineer.

The City Council, Hartford, N. C., has authorized the sale of bonds to an amount of \$100,000, the proceeds to be used for the construction of a municipal electric light and

ice-manufacturing plant, with portion of the fund for water works.

The Dyson Brothers Hardware Co., Olanta, S. C., is making inquiries for machinery to manufacture axe handles and kindred turned wood products.

A vocational department will be installed in the two-story and basement high school to be erected at Fayetteville, N. C., to cost \$150,000, plans for which are being prepared by Milburn & Helster, 710 Fourteenth Street, N. W., Washington, D. C., architects. John A. Oates is president of the board.

The Town Council, Wilson, N. C., is arranging for the construction of a municipal electric light and power plant. A bond issue of \$70,000 has been approved.

The Virginia Machinery & Well Co., 1319 East Main Street, Richmond, Va., is inquiring for a second-hand steam hoisting engine, double drum type.

The Winchester Lumber Corporation, Winchester & Western Railroad Building, Winchester, Va., recently organized, has acquired about 25,000 acres of timber properties in Hardy and Hampshire counties, W. Va., and contemplates the construction of twenty sawmills and a number of general wood-working and finishing plants, including power houses. A cooperage plant is also being considered. William B. Cornwell, head of the Winchester & Western Railroad, is president of the company, and T. D. Kenny, secretary.

Detroit

DETROIT, Feb. 13.

A vocational department will be installed in the new two-story high school to be erected at Traverse City, Mich., estimated to cost about \$300,000, bids for which are now being asked. S. E. Patterson, 406 Hanselman Building, Kalamazoo, Mich., is architect.

The Reading Corporation, 413 West Fort Street, Detroit, is asking for quotations on a high lift steam shovel.

W. P. Papworth, receiver for the Fox Typewriter Co., Grand Rapids, Mich., is planning for the sale of the plant to a corporation, now in process of formation, for about \$300,000. The new organization, J. C. Goldmaer and William Bennington, is planning for changes and the installation of equipment to manufacture a new typewriter, with special keys for short words.

About \$400,000 will be expended by the Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., manufacturer of paper, for the erection of a two machine unit plant addition, two-stories, 90 x 925 ft. Billingham & Cobb, Press Building, are architects. J. Kindebarger is president and manager.

The Owen Sanitarium Co., Ypsilanti, Mich., will build a power house in connection with its new two-story and basement building for light manufacturing service, estimated to cost about \$75,000. O. W. Heinz is general manager.

The Auto Specialty Mfg. Co., St. Joseph, Mich., manufacturer of automobile equipment, is taking bids for its one-story addition, estimated to cost \$100,000. Davidson & Weiss, 53 West Jackson Boulevard, Chicago, are architects.

The Department of Motor Transportation, City Hall, Detroit, is having plans prepared for a three-story municipal garage and service building, 260 x 450 ft., estimated to cost about \$600,000. William C. Markham, 312 Marquette Building, is engineer.

The Michigan State Prison Commission has been authorized to purchase a steel factory building for erection at the Ionia State Reformatory, the cost not to be in excess of \$45,000. It will house a shoe shop, toy factory and other metal industries.

The Village Council, Union City, Mich., has completed plans for a municipal hydroelectric power plant, to cost about \$150,000.

The Curran Motor Products Co., Detroit, will open manufacturing headquarters in Philadelphia. Temporary executive headquarters in Detroit will be in the Book Building.

Indiana

INDIANAPOLIS, Feb. 13.

A vocational department will be installed in the new two-story high school to be erected at Bloomington, Ind., estimated to cost about \$175,000. A. Grindle, 122½ Walnut Street, is architect.

Edward E. Dean and William S. Carleton of the Kokomo Machine Co., Kokomo, Ind., have recently acquired the Wiley interests in the company, and in the future will operate

as sole owners of the business. C. W. Adams is general manager.

A vocational department will be installed in the new two-story high school, 125 x 160 ft now being erected by the Board of Education, North Judson, Ind., and estimated to cost about \$135,000. Kreyer & Maurer, South Bend, Ind., are architects.

The Inter State Car Co., Indianapolis, Ind., completed the addition to its foundry last November and is not making a second extension as reported.

The Varney Electrical Co., Evansville, Ind., is planning for enlargements and improvements in its factory including the installation of additional equipment. It has increased its capital from \$200,000 to \$400,000 for expansion. H. A. Robertson is manager.

William O. Maines, trustee in bankruptcy for the Edwood Foundry Co., Elwood, Ind., is planning for the sale of the plant and property of the company as a going concern, Feb. 24.

A vocational department will be installed in the new one-story high school to be erected at Ruttersville, Ind. H. M. Griffin, McFarland Building, Connersville, Ind., is architect.

Pittsburgh

PITTSBURGH, Feb. 1

In a prospective way the past week has been the most active in the equipment market for several months. This is particularly true of cranes inquires for which total about 34. The Whceling Steel Corporation is inquiring for about 20. One list includes one 30-ton and one 40-ton for the blooming mill, one 30-ton for the continuous mill, one 20-ton for the power house, two of 2-ton capacity for the slab yard, two 2-ton overheads for the sheet bar yard, two 150-ton ladle cranes and a 7½-ton revolving job crane. The latter is for the galvanizing plant at Peach Bottom, W. Va., and was inquired for sometime ago, and the other cranes are for installation at the Strubenville, Ohio works for which a 30-ton control also is wanted. The company also has put out a list of eight cranes for its Portsmouth, Ohio works, six of 5-ton capacity and two of 15-ton. The Ritter Convey Mfg. Co. is asking for bids on six cranes for installation at its plant at Letsdale, Pa. A 10-ton crane is wanted with a 5-ton and a 10-ton trolley, two 7½-ton cranes, each to be equipped with two 5-ton trolleys, and three 3-ton cranes with single trolley and floor control. The Lorain Steel Co., Johnstown, Pa., is in the market for two 5-ton and a 10-ton crane, all mill type. In addition to these there are individual inquiries for two cranes and three cranes from undisclosed sources.

Business remains extremely limited, but the trade is encouraged by the big increase in inquiries, especially as some give promise of closing at an early date. Machine tool sales also are light, but practically all local dealers and manufacturers' agents are figuring against inquiries and orders are expected to materialize before the end of the month. One house is figuring on six heavy face grinders and expects to close on some shortly. The price situation shows no appreciable change. Competition for orders is keen and buyers are sitting back and letting seller slash prices and sacrifice profits.

The Allison Machine Co. has taken bids for equipment for the slag crushing plant of the Shenango Furnace Co., Shippensburg, Pa., which is a building that was recently destroyed by fire.

The Key-ton Drilling Co., Piquette Falls, Mich., is taking bids for three one-story additions, 50 x 100 ft., 60 x 110 ft., and 150 x 80 ft., estimated to cost about \$400,000, with machinery.

The Pen Public Service Co., Johnstown, Pa., has arranged for a bond issue of \$7,000,000, a portion of the proceeds to be used for plant and system extension and improvements.

The National Auto Co., Uniontown, Pa., is planning the erection of a new automobile service and repair works, estimated to cost about \$100,000, including equipment.

The Board of Directors, Joint Consolidated Elementary and Vocational High School, Unionville, Pa., will hold in abeyance until spring the completion of the new high and vocational school, two stories, 112 x 160 ft., foundation work for which has been completed and will take equipment bids later. Ritter & Shay, North American Building, Philadelphia, are architects.

The Wilton Tool Mfg. Co., 1121 Grand River Avenue, Detroit, will soon commence the erection of a new plant at Sharon, Pa., consisting of two one-story buildings, 50 x 200 ft., and 20 x 100 ft. for general tool manufacture.

The S. H. Dickey Coal Co., Johnstown, Pa., has pre-

liminary plans under way for a new coal mining and handling plant in the vicinity of New Florence, Pa. Bids for electrical and mechanical equipment will be asked later.

The Gilmore Coal Co., Oliver Building, Pittsburgh, will soon commence the erection of a new power house, 35 x 99 ft., at its properties at Venice, Pa., estimated to cost about \$50,000. T. E. Cornelius, Megee Building, Pittsburgh, is engineer.

The Seminole Automotive Accessories Corporation, Charleston, W. Va., recently organized with a capital of \$100,000, will establish a machine and repair department for automobile work in connection with a local accessories plant. H. K. Flynn, 1026 Virginia Street, is president and manager.

The Board of Education, Wayne, W. Va., is taking bids until March 2 for a two-story high school, 110 x 160 ft. with vocational department, and estimated to cost about \$150,000. Holmboe & Popue, Empire Bank Building, Clarksburg, W. Va., are architects.

Bids will be taken until Feb. 21 by the Board of Education, Charleston, W. Va., for a two-story high school, 60 x 215 ft., to include vocational department, estimated to cost about \$250,000. Wayne Tucker & Pittman, Masonic Temple, are architects.

A power house will be erected in connection with the two-story school to be built by the Board of Directors, Orange Rural School District, Chargin Falls, Ohio, estimated to cost \$200,000, plans for which are being prepared by Charles W. Bates, 701 National Bank Building, Wheeling, W. Va. Bids will be called for early in March.

Milwaukee

MILWAUKEE, Feb. 1

Unmistakable evidence that there is a definite recovery in the metal working industry in this territory is imparting confidence to the machine tool trade. Operating schedules of foundries as well as machine shops are steadily if slowly increasing. Most encouraging is the first sign of a revival in the agricultural implement and farm operating equipment industry, which has been out of the tool market for about 15 months. Sharp reductions in selling prices, especially tractor, have brought it out in improvement in demand similar to that following the further let-down of automobile selling prices. The immediate benefit of metal operations to the tool industry is of small consequence, considering the small margin of profit left by present reduction, but there seems every reason to believe that a fundamental step has been taken toward enlarging demand which will require a commensurate extension of production. Presently there is no broad need for tools except perhaps for replacement and small additions, but this small requirement is in improvement upon the almost absence of demand for many months past.

The Wisconsin Public Service Co., Green Bay, Wis., a subsidiary of the Wisconsin Securities Co., Milwaukee, has been granted 1932 budget appropriations amounting to \$52,000 for new construction equipment and development. The most important item is the construction of a new hydro electric generating plant costing approximately \$500,000 and developing 6,200 hp. at Johnson Falls on the Peshtigo River near Peshtigo, Wis., a project intermitted three years ago because of unfavorable conditions. Mead & Scantone, consulting engineers, Madison, Wis., are now revising original plan and specifications and will take bids for the construction of a concrete dam, power house, etc., about March 1. C. R. Phoenix, Green Bay, Wis., is vice-president and general manager, Wisconsin Public Service Co. Clement C. Smith, Milwaukee, is president, Wisconsin Securities Co.

The Minneapolis, St. Paul & Sault Ste. Marie Railway Co., Minneapolis, has tentative plans for the construction and equipment of a new terminal plant at Park Falls, Wis., involving an investment of approximately \$500,000 in round-house, repair and machine shops, car sheds and other facilities with a 200-car capacity. The engineering department is at work on plans and specifications which probably will be available to contractors about the middle of March.

The Board of Education, Ashland, Wis., has engaged Kelley & Schefchik, architects, Ashland, to design a manual arts building as an addition to the present high school. It will cost about \$100,000, including machinery and other equipment for vocational training. Bids will be taken about March 20. Samuel Wheeler is secretary of the board.

O. P. Chatfield, formerly of Marinette, Wis., has concluded negotiations with the Commercial Club of Iron Mountain, Mich., by which he will establish a new brass and aluminum foundry, using the abandoned electric light plant building, which he has purchased. The club has contributed \$3,500 in

ask toward the purchase price. Mr. Chatfield for many years conducted a brass foundry at Escanaba, Mich.

The Perdieu Tool Mfg. Co., Milwaukee, which recently was incorporated with a capital stock of \$75,000, has taken over the plant and equipment of the former Meigs-Powell Co., at 522-526 Sixteenth Avenue, and will manufacture machinists' tools, including the Welles patented callipers and dividers, formerly made by the Meigs-Powell Co., the president of which, John D. Powell, has been elected vice-president of the Perdieu company. Rugley A. Perdieu is president; J. B. Matthews, secretary-treasurer, and Max Kobs, superintendent.

The S. W. Miller Piano Co., Sheboygan, Wis., has engaged W. C. Weeks, local architect, to design a one-story brick factory, 56 x 108 ft., which will be erected at once as the first unit of a new piano factory on a new site, 120 x 600 ft., on Lake Michigan, between Niagara Avenue and Washington Court, Sheboygan. The initial investment will be about \$35,000.

The U. S. Tractor & Machinery Co., Menasha, Wis., of which J. M. Robinson, formerly with International Harvester Co., recently became president and general manager, contemplates the erection of a gray iron foundry and an addition to the machine and assembling shop, and will soon be in the market for a miscellaneous equipment. Plans are being prepared by local architects. The investment will be about \$75,000.

The Dahlmann Machine & Mfg. Co., 933-935 Winnebago Street, Milwaukee, has recently increased its authorized capitalization from \$25,000 to \$50,000 to provide for the further development of the business. A. R. Buchholz is president.

The Chippewa Falls, Wis., Board of Education expects to take bids after March 1 for the construction of a junior high and vocational training school, to cost \$175,000. The architects are Parkinson & Dockendorff, LaCrosse, Wis.

The Shurtleff Ice Cream Co., 108 South Main Street, Janesville, Wis., will build a \$65,000 addition to its plant, installing additional boiler and generating equipment, cold storage and refrigerating extensions, tanks, etc. It will be 60 x 115 ft., two stories and basement. The architect and engineer is F. A. Carpenter, Brown Block, Rockford, Ill.

The Elto Outboard Motor Co., Milwaukee, has been capitalized at \$150,000 and organized by Ole Evinrude, who for 18 months has been manufacturing detachable rowboat engines at 62 Mason Street, after a lapse of about eight years since retiring from the original Evinrude Motor Co. It is intended to purchase or build a machine shop and treble the present capacity by May 1. Details are not yet available.

The St. Croix Falls, Wis., Board of Education will be ready for bids about March 1 for the erection of an \$85,000 addition to the present high school, for use as a manual training institute and vocational school. The architect is W. L. Alban, St. Paul, Minn. The Terry-Schulte Engineering Co., St. Paul, is in charge of the mechanical engineering work.

Cleveland

CLEVELAND, Feb. 13

The feature of the local machinery market the past week was a display of activity on the part of railroads. The Nickel Plate Railroad, through its Purchasing Department in Cleveland, issued a list of about 12 machines and an inquiry has reached local dealers for five machines for the New York Central Lines west of Buffalo. This inquiry includes two large machines, a wheel lathe, a multiple spindle drilling machine and three small tools. Local dealers have also received a list of seven machines from the Hocking Valley Railroad, which was noted last week.

Local dealers report a better volume of inquiry, mostly for single machines. Prospective buyers usually inquire for used machinery, and as they are shopping around considerably orders are coming out slowly. The volume of inquiry this month shows considerable gain over January and February sales are expected to be larger than last month.

The Nickel Plate Railroad through its purchasing department, Cleveland, has sent out an inquiry for the following equipment, new machines being asked for in the first two items on the list and used machinery in the remaining items:

- One 48-in. 400-ton carwheel press.
- One air compressor.
- One 42-in. vertical drilling machine.
- One 18-in. lathe.
- One 3-in. triple head bolt cutter.
- One 4 x 24-in. 2-wheel emery grinder.
- One 48-in. hydraulic carwheel press.
- One 1-10-hp. and 1-15-hp., 440-volt, 60-cycle induction motor.

The E. Z. Rim Co., Elyria, has purchased the plant of the Frostee Co., Grafton, Ohio, and will locate its plant in Grafton shortly.

The Pierce Body Co., Fostoria, Ohio, has been incorporated with a capital stock of \$20,000 and has elected J. L. Carter, president, and M. C. Lloyd, secretary and treasurer.

The Doherty Products Co., having a capital stock of \$2,000,000, contemplates the erection of a plant near Uhrichsville, Ohio, for the manufacture of building blocks. It has opened temporary offices in Uhrichsville.

The Visible Pump Co., which will move its plant from Fort Wayne, Ind., to Findlay, Ohio, where it will occupy the former Grant Motor Car plant, has been incorporated with a capital stock of \$750,000.

The Ohio Metal Alloys Co., Fostoria, Ohio, is planning to remodel and enlarge its plant. M. Hayden is president.

A vocational department will be installed in the two-story and basement high school, 120 x 125 ft., to be erected at Port Clinton, Ohio, and estimated to cost \$150,000. Bids will be asked early in March. Thayer & Johnson, Meriam Building, Cleveland, are architects.

The Ross Machine & Spring Co., Canton, Ohio, formerly operating under the name of the Huckle Machine & Spring Co., is planning for enlargements. It was incorporated recently with a capital of \$50,000. D. H. Rose is head.

Cincinnati

CINCINNATI, Feb. 13.

Though machine tool manufacturers are more optimistic the past week, orders placed were comparatively few compared with preceding weeks. A number of fair-sized orders, however, were placed for second-hand tools, two Louisville manufacturers taking \$10,000 worth each. A Cincinnati valve manufacturer was also a purchaser of new and second-hand equipment, about 10 machines being involved, and a northern Michigan manufacturer bought seven turret machines. With these exceptions most of the orders booked were for single machines. There were no new lists of size reported, but the number of inquiries for single tools is on the increase. A local manufacturer quoted on an inquiry for 12 milling machines the past week and it is expected that this business will be placed. The Ford Motor Co. is expected to close for two planers during the week and some automobile business is under negotiation, with an excellent chance of a large order being placed.

The Miller Improved Gas Engine Co., Springfield, Ohio, has let contract to the Concrete Steel & Construction Co. for an addition 39 x 65 ft., to be used as a cleaning room.

G. M. Gest, contracting engineer, Cincinnati, has purchased the property of the Carthage Buggy & Wagon Works, Carthage, Ohio. It will use the plant as a warehouse and the machine shop will be used for the construction, maintenance and repair of contractors' equipment.

The Non-Liquid Door Check Co., Comstock Building, Columbus, Ohio, has been incorporated with a capitalization of \$200,000. It was organized to take over the business of the Johnson Liquidation Door Check Co., Chicago, and it is the intention to move the plant from Chicago to Columbus about May 1. E. B. Gerlach is president.

The Holland-Flynn Mfg. Co., London, Ohio, has been incorporated with a capitalization of \$50,000 to manufacture One-Minute steel posts, poles and stakes for fencing purposes. The organization of the company has not been completed, but it is intimated that the plant will be established in London. W. A. Holland is president and general manager.

The Murphy Valve Co., Columbus, Ohio, recently incorporated with a capitalization of \$50,000 to manufacture plumbers' and steam-fitters' supplies, will not at the present time equip a plant but will have its products made on contract. Paul R. Good is president. Offices are at 305 Maestle Building.

The Walter L. Lillie Co., 233-37 Sycamore Street, Columbus, Ohio, will soon commence the erection of a two-story addition, 40 x 250 ft., to its wood-working plant, estimated to cost about \$100,000, including machinery. J. B. Powell, 1455 Eastwood Avenue, is architect and general contractor.

The Terminal Ice & Cold Storage Co., Dayton, Ohio, has completed plans for a new eight-story refrigerating and cold storage plant, 135 x 150 ft., estimated to cost about \$500,000, including equipment. G. B. Bright Co., 103 Marquette Building, Detroit, is architect.

The Central South

St. Louis, Feb. 13.

The N. O. Nelson Mfg. Co., Chestnut and Thirteenth streets, St. Louis, manufacturer of pipe, pipe fittings, plumbing equipment, etc., has acquired property on McKinney Avenue, Dallas, Tex., 115 x 260 ft., as a site for a branch works. Plans are being prepared for a building to cost about \$100,000. Charles G. Singleton is general manager.

The Southland Motor & Body Corporation, Old Hickory, near Shelbyville, Tenn., will install new equipment at its plant. R. A. Wells is secretary and treasurer.

The **Charles Power & Water Co.**, Joplin, Mo., has arranged for a bond issue of \$3,000,000, a portion of the proceeds to be used for plant and system extensions and improvements.

The **S. G. Hoffman Magneto Co.**, 3932 Olive Street, St. Louis, has broken ground for its one-story works at 3872 Washington Avenue, 100 x 235 ft., estimated to cost about \$50,000. S. G. Hoffman is president.

Lawler & McKinney, Monett, Mo., P. O. Box 311, are making inquiries for machinery for use at a wood-working plant.

F. W. Parks, Frisco Building, St. Louis, has plans under way for a three-story automobile service and repair building, 100 x 180 ft., on North Euclid Avenue, estimated to cost about \$50,000.

The **American Foundry & Mfg. Co.**, 2027 Brooklyn Avenue, Kansas City, Mo., will hold in abeyance the erection of its new plant, one-story, 90 x 135 ft., estimated to cost about \$35,000, contract for which recently was awarded. It is expected to commence work early in the spring.

The **Big Sandy Refining Co.**, Paintsville, Johnson County, Ky., recently organized, has plans under way for a new refinery with initial daily capacity of about 100 bbl. utilizing crude oil from the Berea fields. Ralph Stafford is president, and Earl Stafford, secretary and treasurer.

The **E. B. Hartwell Handle Co.**, 120 Dock Street, St. Louis, has leased a building for the manufacture of handles and will develop an initial daily capacity of about 40,000. Equipment will be electrically driven, with power furnished from the company's plant. E. B. Hartwell is secretary and manager.

The **Lucey Mfg. Corporation**, 233 Broadway, New York, manufacturer of oil drilling machinery, engines, pumps, etc., has acquired property at Henryetta, Okla., 100 x 200 ft., for the erection of a new factory branch, 70 x 120 ft.

A vocational department will be installed in the three-story junior high school building to be erected at Springfield, Mo., 60 x 172 ft., with wing, 50 x 70 ft., estimated to cost about \$200,000, bids for which are being taken by Hawkins & Hoener, 400 McDaniel Building, architects.

The **Universal Co.**, Oliver and Beaumont streets, St. Louis, manufacturer of automobile tops and other automotive equipment, has acquired property, 135 x 250 ft., for a new three-story plant, to approximate about 100,000 sq. ft., of floor area, and estimated to cost in excess of \$250,000, including equipment.

The **Acme Brass & Machine Works**, 1628 Oak Street, Kansas City, Mo., has awarded a contract to S. W. Hite, South Park, Kan., for a two-story machine shop, 25 x 115 ft., at 609 East Seventeenth Street.

The **Wilson Slaughtering Device Co.**, 511 American Bank Building, Kansas City, Mo., is arranging for the erection of a new plant, in the vicinity of Raystown, Mo., to manufacture special meat-cutting and slaughtering equipment estimated to cost about \$50,000. John A. Wilson is president.

Adolph Schmolinski, who has been operating an automobile repair shop at 1552 South Seventh Street, St. Louis, under the name of the **Red Star Motor Co.**, has organized the **Cert-N-Tite Piston Ring Co.**, with a capital stock of \$50,000, \$30,000 paid, to manufacture piston rings at the address named.

The **University of Missouri** will open bids at Columbia, Mo., Feb. 24, for the construction of a power plant, also boilers, traveling cranes, etc. **Jannieson & Pearl**, Arcade Building, St. Louis, are the architects.

Canada

TORONTO, Feb. 13

Machinery and equipment dealers are securing a fairly steady volume of business. While big lists are still absent, buyers are entering the market in larger numbers with small lists. Inquiries for various lines are being received, and although some of these are turning into almost immediate sales, the majority appear to be sent out by users who are contemplating buying later. Municipal governing bodies are spending money more freely on equipment for waterworks, sewage and electric plants. On the whole this market is beginning to show steady signs of improvement and the outlook is brighter than it has been at any time since the close of the war. Practically all lines of small tools have been moving freely of late and users are beginning to buy in larger quantities, and at the same time some orders are coming in for future delivery.

The city of **Sarnia, Ont.**, will enter the market soon for the following equipment for its new technical school, which is expected to be opened by next September: Five lathes with 6-ft. bed, 14-in. swing, one to be a tool-room lathe with quick change gears; one 16-in. shaper; one drill press; one universal milling machine; one power hack saw, forges, vices, etc. In the wood-working department the following machines will be required: One combination cut-off and rip saw; one hand saw; one tool grinder; one port-

planer and three wood-turning lathes of different sizes. In addition, a blue print machine will be purchased. All machines will be motor driven.

T. J. Moore, Wlarton, Ont., is in the market for a double-end matcher for hardwood flooring.

The **Dresden Machine Shop & Garage**, Dresden, Ont., is in the market for equipment for a machine shop and auto repair shop.

The **Malcolm Furniture Co.**, Listowel, Ont., is in the market for equipment for a machine shop, including small metal working tools, drills and lathes.

The **Canadian Tobacco Growers' Co.**, Kingsville, Ont., is in the market for tanks, shredders and special machinery for the manufacture of fertilizers for tobacco growers.

The **Holden Co.**, 354 St. James Street, Montreal, has assumed control of the **Canadian Brake Shoe Co.**, Sherbrooke, Que., manufacturer of electric steel castings, etc., and is in the market for a punch and shear. New tools are preferred, but second-hand or re-manufactured machines in good condition will be considered for prompt delivery. N. J. Holden, president Holden Co., is president of the reorganized Brake Shoe company. The board of directors of the Holden Co. comprise largely the directors of the Canadian Brake Shoe Co., and as the Holden Co. has interests in other plants, machinery from some of these is being moved to Sherbrooke in an endeavor to consolidate the Holden manufacturing activities in one plant.

The **Fraser Brace Co.**, Montreal, will shortly commence construction on four ships at its Three Rivers, Que., shipyard.

The **Canadian Pacific Railway** will construct mechanical coaling plants at Estevan, Sask.; Swift Current, Sask.; Medicine Hat, Alta., and La Riviere, Man., to cost \$17,000 each. J. C. Holden, Winnipeg, is district engineer.

La Cie de Machinerie Merciere, St. Laurent Street, Levis, Que., will build an addition to its machine shop at a cost of \$20,000. N. J. Merciere is manager.

The town of **Bright, Ont.**, is contemplating the installation of an electric light and power plant. George Oliver is clerk.

The town of **Southampton, Ont.**, contemplates installing a power system. D. MacAuley is clerk.

T. Dick, Jr., president **National Sand & Material Co.**, Welland, Ont., has signed a contract with the **Collingwood Shipbuilding Co.**, Collingwood, Ont., for the construction of a sand and gravel carrier with a capacity of 2200 cu. yd. Mr. Dick stated that he could have let the contract in Glasgow, Scotland, at a saving of \$30,000, but as the boat is to be used on Canadian public and municipal works, also in view of the unemployment in Ontario, he thought it best to have the shipbuilding done in Canada. The company has increased its staff by 150 men.

The **Fleming Publishing Co., Ltd.**, Owen Sound, Ont., is in the market for a 3-hp, variable speed 550-volt, three-phase, 60 cycle motor, about 1200 r.p.m.

The **Bain Wagon Co., Ltd.**, Woodstock, Ont., advises that its plant has not been acquired by the **Ford Motor Co.**, as stated in these columns Feb. 2.

The Gulf States

BIRMINGHAM, Feb. 13.

The **Todd Shipyards Corporation**, 25 Broadway, New York, has acquired property of the **Mobile Shipbuilding Co.**, Mobile, Ala., for the establishment of a new branch plant. **William H. Todd** is president.

The **Dallas Power & Light Co.**, Dallas, Tex., has preliminary plans under way for extensions in its electric power plant and system, including the installation of considerable new equipment. C. W. Davis is vice-president and general manager.

The **Sterling Carbon Co.**, Sterlington, La., is planning to rebuild the portion of its plant, including machine shops and power house, destroyed by fire, Jan. 11, with loss estimated at close to \$30,000.

The **Common Council**, Dothan, Ala., has arranged a special election to vote bonds for \$70,000, a portion of the proceeds to be used for the erection of an addition to the municipal electric power plant.

The **Singer Sewing Machine Co.**, 149 Broadway, New York, has tentative plans for a new works at Tallulah, La., to manufacture sewing machine cabinets, cases, etc. It has a large tract of timber property in this section.

The **Humphreys-Pure Oil Co.**, Mexia, Tex., has completed plans for a one-story machine shop, 50 x 100 ft., to be used primarily for automobile repair and parts manufacture, in conjunction with a new one-story service building and garage, 60 x 100 ft., for company trucks and cars, now in course of construction.

The **A. B. C. Millwork Co.**, 8 Jackson Street, Fort Myers, Fla., is planning for the establishment of a new factory to manufacture store fixtures, show cases, etc. A list of equipment is being arranged.

New England

Boston, Feb. 13.

The General Electric Co., Lynn, Mass., the past week issued a list of 42 machine tools for an experimental shop, to be applied to fine measurement work. While price is a consideration, early deliveries are the primary factor. In addition, the company is inquiring for a comparatively large amount of heavy equipment, including 12 large vertical milling machines, two 42-in. vertical boring mills, six heavy plain horizontal milling machines, four large horizontal boring mills, four medium sized lathes and other equipment, presumably for its Gloucester, Mass., works. The heavy equipment is part of a list originally issued months ago and abandoned because of business conditions. Since then the company has drawn on several of its New England subsidiary plants for equipment needed at Lynn.

With the exception of the above list the local machine-tool market has been without special feature. Sales have been small, amounting in the aggregate to perhaps a dozen pieces of equipment to as many different concerns. The H. B. Smith Co., Westfield, Mass., list has not been covered. Prices given this company by used machine-tool dealers here and elsewhere practically eliminate representatives of builders.

It is believed the Maine Central Railroad will close on its three tools, one of which is a driving wheel lathe, before the end of the week. While nothing authentic has been given out, it is the opinion that the Bangor & Aroostook, the Central Vermont and the Rutland railroads will take some definite action on their lists within the next month or two. Purchases against the Boston & Albany list probably will be extended over the entire year.

The inquiry of Gray & Davis, Cambridge, Mass., for special automatic machinery, involves large equipment and competition is keen. Prices for automatic equipment, on the surface, appear weaker than the ordinary run of machine tools. Certain makers of lathes, however, are willing to make concessions, provided the business warrants, and prospective customers report low prices have been named.

The prospect of a general strike in the cotton textile industry, as a result of a cut in wages, has resulted in a few withdrawals of inquiries for machine tools. The rubber mold making trade, on the other hand, is more active, most of the plants operating on full schedules and showing more or less interest in metal-working equipment.

The crane market is slightly more active. The Lamson Co., Boston, has purchased one 10-ton crane for its new New York State plant and a Rhode Island oil refinery bought two 2-ton cranes. Stone & Webster, Boston, are inquiring on one 15-ton crane with a 22 ft. span, three motor, for the Ford, Flat Rock, Mich., development.

The Rhode Island Malleable Iron Works, Hills Grove, R. I., will shortly erect a one-story, 67 x 252 ft. manufacturing unit.

The Hartford Electric Light Co., Hartford, Conn., has awarded contract for a one and two story addition, 80 x 160 ft., to its plant on Sheldon Street.

The Board of Fire Commissioners, New Britain, Conn., have plans for the erection of a repair shop to cost about \$6,500.

The Eastern Mfg. Co., Norwalk, Conn., has recently been incorporated under Connecticut laws to manufacture timer protectors, internal combustion engines, tools and equipment for motor vehicles. The capital stock is \$50,000 and the officers are Phillip H. Fielding, 26 Pleasant Street, East Norwalk, president and general manager; Frank N. Glover, vice-president and secretary; and Charles P. Fielding, treasurer.

The Clapes Brothers Garage Co., West Main and Vigil streets, Stamford, Conn., will erect a garage and service station on the Boston Post Road, one-story, 55 x 70-ft. It will contain a repair shop.

Fire, Feb. 5, destroyed a building at the plant of the Trumbull-Vanderpool Electric Mfg. Co., Bantam, Conn., with loss estimated at about \$20,000.

A vocational department will be installed in the new two-story high school at Palmer, Mass., estimated to cost about \$168,000. E. C. & G. C. Gardner, Springfield, Mass., are architects.

The George Grow Tire Co., 323 Columbus Avenue, Boston, has awarded a contract to Coleman Brothers, Inc., Boston, for a one-story, reinforced-concrete addition to its plant on Jackson Street, Canton, Mass., 41 x 101 ft., estimated to cost about \$50,000.

A vocational department will be installed in the proposed addition to be erected to the Salem, Mass., high school, for which an appropriation of \$250,000 is being arranged.

The Crossman & Knowles Loom Works, Harris Avenue, Providence, R. I., manufacturer of textile machinery, has awarded contract to Bowerman Brothers, 230 Industrial Trust Building, for a one-story addition, 26 x 105 ft.

A one-story automobile service and repair building for company cars will be erected by the National Bedding Co., 28 School Street, Boston, to be 75 x 133 ft., and estimated to cost about \$42,000. The F. J. Van Eiten Co., 80 Boylston Street, is contractor.

A one-story steam power house, 26 x 42 ft., to cost about \$30,000, will be erected by the Fall River Gas Works Co., 24 Manton Street, Fall River, Mass.

The John Hugo Mfg. Co., New Haven, Conn., has recently filed a certificate to increase the capital stock of the company from \$50,000 to \$150,000.

Buffalo

BUFFALO, Feb. 13.

The Chevrolet Motor Co., Flint, Mich., with eastern plant at Tarrytown, N. Y., has arranged for the erection of a new three-story, reinforced-concrete branch on Delaware Avenue, Buffalo, totaling about 40,000 sq. ft. A portion of the building will be given over to assembling and other operations, and the remainder as a distributing plant. Elwood M. Harris is local manager.

The Pyrene Mfg. Co., Inc., 17 East Forty-ninth Street, New York, will operate a new plant in three buildings secured from the Wickwire-Spencer Steel Corporation, Buffalo, for the manufacture of tire chains. The organization will be known as the Off & On Chain Corporation, a subsidiary. It is proposed to concentrate all manufacturing at this point. O. H. Christie is local manager.

The Bolivar Refining Corporation, Bolivar, N. Y., has preliminary plans under way for the erection of a local refinery. Charles A. Chapin is president.

The iron and metal working plant of Hyman L. Lapins, Maple Street, Danville, N. Y., was partially destroyed by fire, Feb. 6, with loss estimated at about \$17,000.

A vocational department will be installed in the new high school to be erected at Corning, N. Y., to be known as the Corning Free Academy. Howard Greenley and F. H. Dewey & Co., Inc., 175 Fifth Avenue, New York, are architects and engineers.

The Pierce Arrow Sales Co., Buffalo, 1695 Elmwood Avenue, has acquired property at Main and Riley streets, 98 x 300 ft., for the erection of a building for service work and headquarters.

John P. Jaekel, City Hall, Auburn, N. Y., city manager, has completed plans for a one-story municipal automobile service and repair building, 38 x 110 ft., for city cars. M. J. Bullock, City Hall, is engineer.

Plans of New Companies

The Morrison Concrete Products Co., Pleasantville, N. J., has taken over the business and equipment of Horace Morrison for the manufacture of blocks, cast stone and concrete products in general. The company expects to build on a plot which it has purchased. Its present plant is in full operation.

The Automotive Appliances Mfg. Co., New Brunswick, N. J., is having all its work done by contract and has arranged all contracts with the exception of a small high-speed lathe with electric motor. It is making a specialty of a patented oil cock for Ford cars.

Frank Harris Sons Co., Inc., 332 South Michigan Avenue, Chicago, has been incorporated in Illinois with power to purchase and liquidate plants of all kinds, properties, railroads, inventories, etc., and to carry on a general trading and merchandising business. The aim of this company will be to secure greater realization from assets than was heretofore obtainable through public auctions, private negotiations, etc. The company has a staff of merchandising experts in nearly every field, and will enjoy the benefits of co-operation with New York and Chicago financiers. Organizers of the company are Harvey L. Harris and Francis L. Harris, both formerly connected with Harris Brothers Co., Chicago.

Henning Brothers & Smith, Inc., smelters and refiners of metals, Engert Avenue at Eckford Street, Brooklyn, have not yet perfected plans but expect to erect a building with about 10,000 sq. ft. of ground space. The company will be in the market for equipment by next spring.

The Philadelphia office of the Hauck Mfg. Co., manufacturer of portable oil burners, torches, furnaces, etc., has been moved to 1726 Sansom Street. Herbert Vogelsang, who has been connected with the company for six years, will be in charge.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Flats, base price	3.13c.
Beams and channels, angles and tees	
3 in. x 1/4 in. and larger, base	2.63c.
Channels, angles and tees under 3 in. x	
1/4 in., base	2.53c.

Merchant Steel

	Per Lb
Tire, 1 1/2 x 1/2 in. and larger	2.50c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger) ..	2.70c.
Toe-calk, 1/2 x 3/4 in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard ..	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

1/4 in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb
No. 10	3.28c. to 3.53c.
No. 12	3.38c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C R, One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	4.10c.
Nos. 22 and 24	3.60c. to 3.85c.	4.15c.
No. 26	3.65c. to 3.90c.	4.25c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	4.25c.
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel

	Black Galv	Wrought Iron	Black Galv
1/4 in. Butt	56 -40	1/4 in. Butt	30 -13
1/2 in. Butt	61 -47	1 1/2 in. Butt	32 -15
1-3 in. Butt	63 -49	2 in. Lap	27 -10
3 1/2-6 in. Lap	60 -46	2 1/2-6 in. Lap	30 -15
7-8 in. Lap	56 -34	7-12 in. Lap	23 -7
9-12 in. Lap	55 -33		

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Coppered soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 1/4 c. to 17 1/2 c.
High brass wire	17 1/4 c. to 17 1/2 c.
Brass rod	14 1/4 c. to 15 c.
Brass tube, brazed	26 c. to 27 1/2 c.
Brass tube, seamless	18 1/2 c. to 19 c.
Copper tube, seamless	21 1/4 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21c. to 21 1/2 c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Primes Wasters
	"AAA"	"A"	80 lb....	\$6.05 \$5.80
	Charcoal	Charcoal	90 lb....	6.15 5.90
	14x20	14x20	100 lb....	6.25 6.00
	IC.. \$10.00	\$8.50	IC...	6.40 6.15
	IX.. 11.25	10.00	IX...	7.40 7.15
	IXX.. 13.00	11.50	IXX...	8.40 8.15
	IXXX.. 14.75	13.25	IXXX...	9.40 9.15
	IXXXX.. 16.25	15.00	IXXXX...	10.40 10.15

Terne Plates

8-lb Coating 14 x 20

100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	34c.
Bar	40c. to 45c.

Copper

Lake ingot	15 c.
Electrolytic	14 1/4 c.
Casting	14 1/2 c.

Spelter and Sheet Zinc

Western spelter	6 1/2 c. to 7c.
Sheet zinc, No. 9 base, casks	10 1/2 c. open 11c.

Lead and Solder*

American pig lead	5 1/4 c. to 6 1/4 c.
Bar lead	6 1/4 c. to 7 c.
Solder, 1/2 and 1/2 guaranteed	24c.
No. 1 solder	22c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Rabbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade 1, per lb.	25c.

Antimony

Asiatic	6 1/4 c. to 6 1/2 c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....26c. to 28c.

Old Metals

Business is very discouraged and transactions are scarce. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.00
Copper, light and bottoms	8.00
Brass, heavy	5.25
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	7.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, February 23, 1922

ESTABLISHED 1855

Side Line Tides Foundry Over Depression

Sporting Goods Castings Kept Foundry Going -- Showed
Considerable Increase in 1921—Application of
Special Metal to New and Difficult Field

BY MORRIS A. HALL

IT has often been said in jest, "If your business interferes with your pleasure, give up the business."

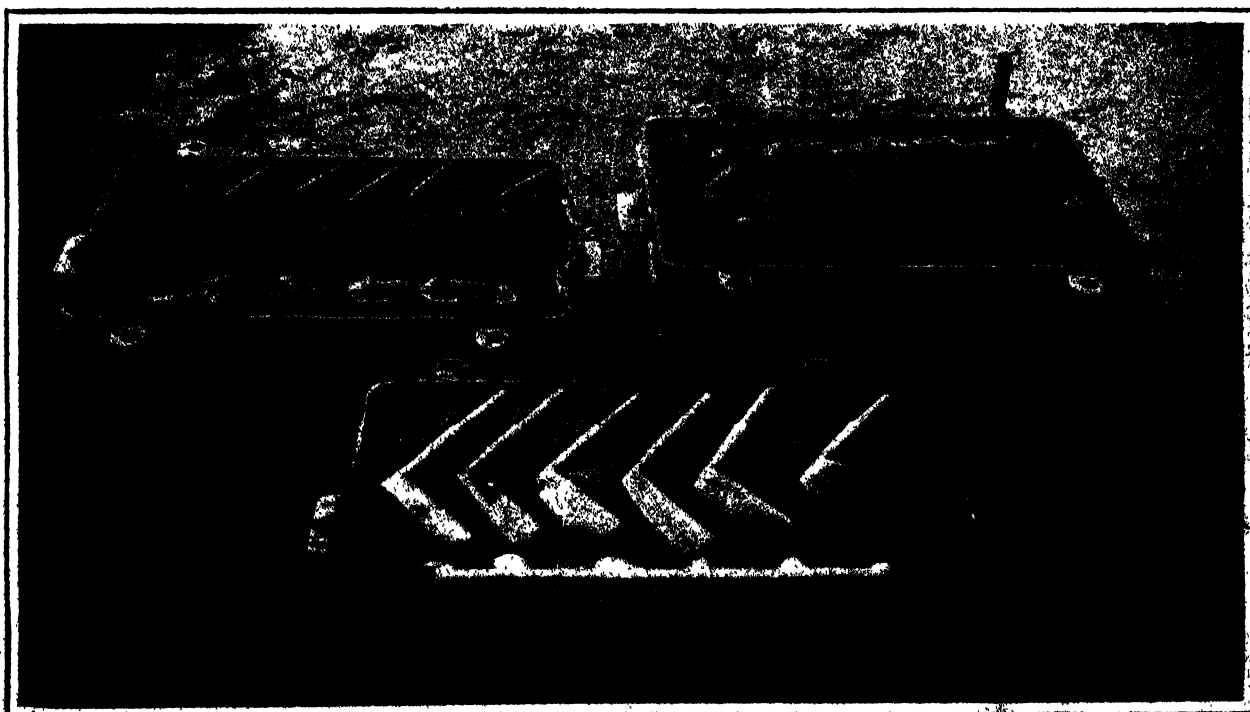
Yet there is a great deal of truth hidden in that supposedly humorous remark, for, no matter how poor business may be, the business man seldom gives up his pleasures or recreations, especially the out-of-doors ones which help conserve his health. One foundry has learned this in the last two years, and has continued to do a fine business in a small side line, which happened to be of a sporting nature, when all other business fell off or was canceled because of dull times.

This foundry is that of the Monel Metal Products Corporation, Bayonne, N. J., a subsidiary of the International Nickel Co., and the active agent for pushing the latter company's natural copper-nickel alloy. This metal is not an easy one to handle, and the plant is primarily a laboratory for the purpose of finding out all there is to know about the metal, its melting, molding, casting, and general handling and use, and is actively engaged in disseminating this information. Incidentally, in seeking new fields of use for the metal, the

plant takes in a considerable amount of job foundry work in monel metal, and some in nickel.

In seeing new fields for the metal and more work for the foundry, golf club heads were tackled several years ago. It is a well-known fact that the advanced golfer is very particular about his clubs, especially his irons. In caring for these, however, it is found that they rust easily. This is probably due to the fact that, in use on the links, they become wet or damp, with no means of drying them until the club house is reached an hour or two later. When the iron has rusted, it can be cleaned up only by buffing, or grinding and buffing, according to how badly it has rusted. This process changes the size and shape, and with it the hang of the club, for no matter how minute the amount of metal taken off, several repetitions of this treatment make an appreciable difference.

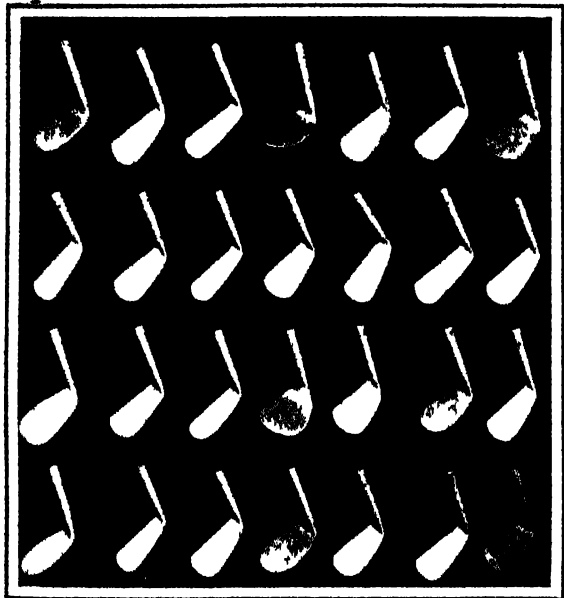
Monel metal is both rust- and acid-proof, consequently it fits well into this service. Moreover, it has a nice white color, not unlike silver, which gives it a good appearance. As it is hard, like steel, it wears well,



Cope and Drag Molds for a Group of Six Golf Club Heads; in the Foreground Is Another Drag Mold with the Pattern and the Gate Pattern in Place

as it is strong, it will withstand the hard knocks equally as well as steel heads. In addition, it is slightly more resilient than steel, so that the ball will leave a monel metal head "clean," and with just the right "feel."

If desired, it can be given a very high polish, and when polished, it will retain this beautiful surface sheen much longer than other metals. When given its normal dull finish that of a razor or of a nickel piece



Group of Twenty-four Representative Golf Club Heads Made in Monel Metal

after some use, it can quickly be retored by the use of soap and water or by rubbing with sand.

The fact that it is a cast metal, and when cast has the properties of forged steel makes it possible to duplicate any head or to copy the best imported forged heads from the leading Scotch cleek makers without variation, quickly and comparatively speaking, cheaply. Granting all these qualities, it was simply a matter of getting golfers to try the new metal when it was at once established as satisfactory. Since that happened several years ago the plant has been making these heads in considerable quantities for a New Jersey firm which furnishes them up in final club form with handle and markets them.

This business has grown slowly but surely and now has reached the point where it forms a considerable portion of the work done. Moreover, it has not dropped off during the recent dull times. In fact some 35,000 of these heads were turned out in 1921 up to the middle of September, with the business continuing so strongly as to indicate the year's total at above 40,000. For 1922 the company expects to turn out about 60,000. In 1920 the number was only 25,000.

This could hardly be classified as "tommy" for the heads average 0.6 lb. each. This makes a gate of six of them, with very large risers and wide gates, total less than 10 lb. One illustration gives an idea of the wide variety of the style which are being made now. These 28 shapes, however, do not represent all that are made, as new shapes are constantly being added as demand develops for them. As has been said the metal is not an easy one to handle, but so many of these golf heads have been turned out from the plant that valuable experience has been gained and they are now handled very readily, cheaply and quickly.

It has been found that this metal gives the best results only with baked molds, as well as baked cores, but in very small articles, weighing a pound or less, such as these golf heads, the molds are made in green sand. A complete mold is shown ready for closing; in the background at the right is the cope, at the left

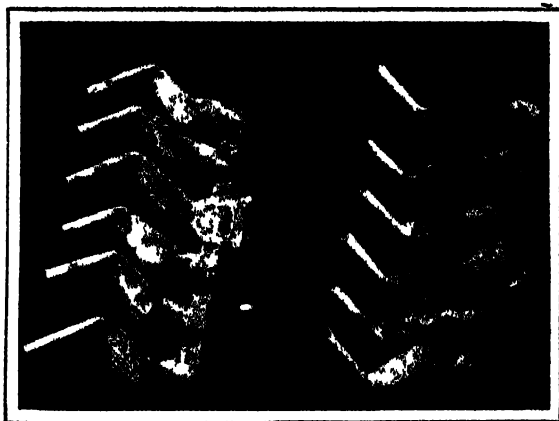
the drag, and in the foreground another mold with the patterns in place.

While cast as a gate, these patterns are individually not gated, so that it is possible to change the shapes very quickly. A new pattern is simply substituted for the one which is least wanted, and the molding goes on exactly as before. In molding the metal, very wide gates and many large risers must be used, because the metal is not easily held in a fluid state. It has to be heated to 3000 deg. Fahr. in melting, but does not hold this high temperature for any length of time, and must be poured quickly. Hence the molds are made up with wide gates and easy bends, so as to lead the metal to the molds quickly, while still hot. This can be noted in the pattern for the gate, used for quickness and convenience to be seen in the front of the cut, and also visible in the cope at the rear.

Another photograph shows a front and a rear view of a gated group of golf heads, where the gates will be noted to be practically as wide as the widest part of the molds. The large amount of metal in the gates and risers approximating 50 to 55 per cent of the total metal will be noted, as well as the size and shape of the leads from the main gate to the individual patterns, very short, wide and with easy bends, to lead the molten metal to place quickly.

The metal is poured from ladles holding 100 to 150 lb., after pouring and deoxidizing with magnesium, using 1½ oz. per 100 lb. This is a continuous process, as many molds being poured each heat as are ready for pouring, and the molding going on continuously. They are bench molded, and are rammed up by hand.

After castings, like those shown are ready, the excess metal of gates and risers is cut off and is cleaned before being charged back into the furnace. An average furnace charge is 10 per cent scrap and 90 per cent new metal. The cutting off is done with a very fine aluminum wheel for the small stuff, but large risers are



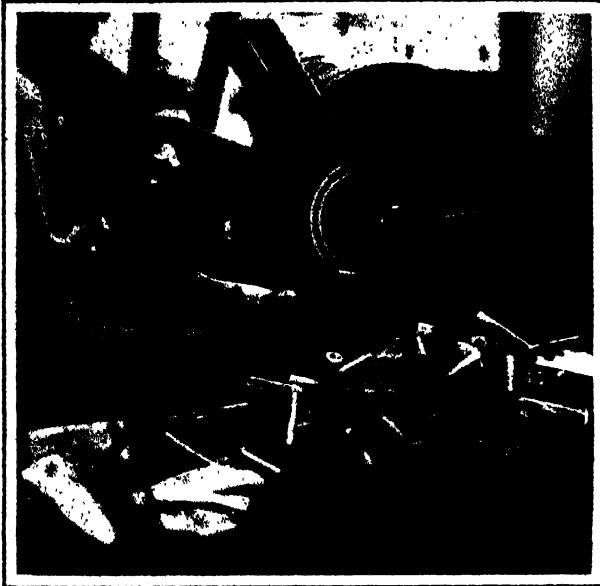
Front and Rear Views of a Complete Gated Group of Six Heads Showing the Unusual Width of Gates and Size of Riser

cut off with the oxy-acetylene torch. After cutting apart, the individual castings are ground to a clean, smooth surface.

This is rather a nice job, because the shape as cast closely approximates the shape desired, and only enough metal should be taken off to produce a smooth, even surface. Special holding fixtures are not used, since this would run the expense up too high, but these are approximated by holding the heads in formed soft pine blocks, and grinding them while so held. These blocks are 4 x 3 x 1½ in., this being large enough, on the one hand, to receive the golf head, and a good size for the workman, on the other.

The head is slipped into a block and held up to the grinding wheel and the grinding completed as quickly as possible. But this is not an instantaneous process, as one might think, for the surface is quite hard and

a number of applications are necessary. One photograph shows this work, with a supply of the partly ground heads visible at the right, and, at the left, some of the wooden forms for holding them in contact with the wheel. As this view shows, a large and wide wheel is used, this being a Norton alundum, 14 x 2½ in., grain 29, grade 2. The operator soon acquires great skill in producing the required smooth surface without



Simple and Quick Method of Grinding Golf Club Heads to a Commercial Finish by Use of Wooden Holding Forms

taking off much metal, and this, in turn, becomes a factor in turning the heads out quickly and cheaply.

After the grinding is completed, the socket for the handle, which has been cored out slightly, is reamed. For this purpose a special taper reamer is used and the heads, which usually have a very mean shape with nasty angles, are held in a special vise with hinged jaws. Both the reamer and the vise can be seen in one view, a drill press being used for this work. The heads are slid into the vise from below, a turn of the handle catches them, the drill press arm is drawn down, moving the reamer into the cored hole. A little more pressure, and in a second the socket is complete. In this form, the golf heads are completed so far as this plant is concerned, and are ready for delivery to the sales agents, who fit the handles and distribute them.

As can be seen, this small part, forming very much of a side line in the beginning, and still not important from a tonnage basis, has nevertheless kept the plant turning over through the dullness of 1920 and 1921, and bids fair to go even further in 1922. The number of heads in 1921 will show close to 40 per cent increase over 1920, and the present estimate for 1922 shows a further increase of about 35 per cent. Considering general business conditions and these figures, we have to go back to our starting point for an explanation that business may be poor, but certain sports or recreations go on forever. A good tip for foundrymen, taken from this instance, would be: "in dull years, get into some form of sporting goods production."

T. E. Keating, general engineer of the Westinghouse Electric & Mfg. Co., presented a paper before the Cleveland section of the American Institute of Electrical Engineers Feb. 21, on "Power Plant Economics with Special Reference to the Steam Turbine."

In 1921 the United States imported 3,365,732 tons of manganese ore, 1,952,848 tons coming from Brazil, 734,516 tons from British India, 965 tons from Japan, 679 tons from Cuba and 676,724 tons from other countries.

Railroads of Japan

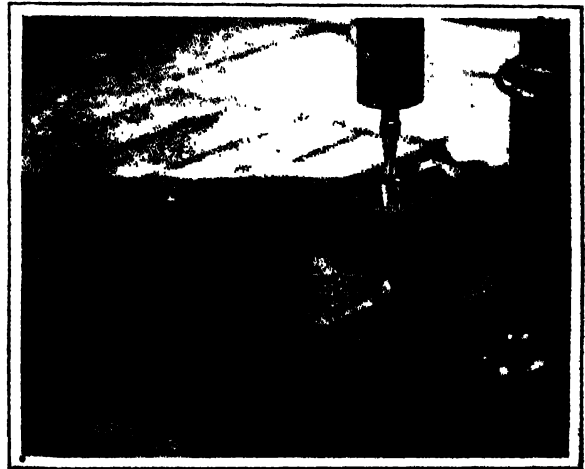
An annual report for the year ending March 31, 1919, with supplementary data for the following year, has just been issued in English by the Department of Railroads of the Government of Japan. This consists of a book of 116 pages, 8½ x 12 in., and includes a large amount of tabulated data concerned chiefly with the financial operation of the state railroads. Some attention is paid also to the privately operated railroads and tramways in Japan. A folder in the back contains a comprehensive map of Japan with the railroad systems clearly outlined.

Some of the outstanding features in the 1920 report include the railroad extent as 6133 miles, the train mileage as 77,222,058, and car mileage as 1,644,562,327. This works out at 21.1 cars average per train and at 26.815 car miles per mile of line. It shows also 1259 train miles per mile of line. Passengers to the total of 357,881,957 were carried a total distance of 7,942,632,396 miles, or an average journey of 22.2 miles. Freight to the extent of 59,939,535 tons was carried an aggregate of 6,292,798,261 miles, or an average of 105 miles per ton. This works out at 1,311,000 passenger miles and 1,026,000 freight ton miles per mile of line.

Small cars are the rule, for the aggregate capacity of the 51,067 freight cars is 570,192 tons, or 11.17 tons per car, on the average. And the average number of passengers carried per car is but 14.8, there being an average of 13.6 cars in each passenger train. Locomotives number 3120, with an aggregate weight of 194,655 tons, or an average of 62.4 tons each.

Labor Efficiency Related to Hours of Work

Labor efficiency, in a statement by the American Engineering Council, is said to be higher with three 8-hr. shifts than with two 12-hr. shifts. This is the conclusion of a committee on work periods in continuous industries, with special reference to the steel industry. Investigations thus far have been to a great extent



Swivel-Jaw Vise and Special Taper Reamer Used in Drill Press to Ream Out Sockets to Fit Handles

outside the steel industry. There are said to be from 40 to 50 industries involving a certain amount of continuous operations, and, as a class, these industries underlie a large portion of our industrial fabric.

As there are still a great many plants operating with 12-hr. shifts, the matter of fatigue and labor efficiency assumes importance. It is estimated that the number of shift workers in the United States is somewhere between 500,000 and 1,000,000. It is also estimated that the number of men on 12-hr. shifts in the period preceding the depression was about 300,000. About as many of these were outside the steel industry as were in it, and, as might be expected, the results in efficiency of working have varied enormously in different plants, depending upon conditions. It is stated that in most of the plants which have recently changed from two shifts to three, efficiency was not greatly improved, due to unfavorable labor conditions.

TAKING INITIATIVE IN BUYING

Importance of Knowing the Market—Where to Get Machines, Supplies, Men

BY JOHN J. RALPH

With the realization that purchasing is an opportunity, that the neglect to buy costs money and that unwise buying is inexcusable, there logically follows the realization that the initiative should be taken by the buyer and not by the seller. The tenseness of the conditions of the past six years has added appreciation to the importance of buying, but not particularly to the betterment of the technique. There developed a realization that buying was a necessity its perfection was assumed to be simply a lengthening of the purse at the buyer's disposal.

There has grown up in our popular business literature a curious appreciation of love and sentiment in the relation between buyer and seller. At times this has been quite gushing. Just a little common sense. There is but one real long time basis for relations between buyer and seller—"The biggest possible re-sale value for a dollar." That is all, just simply value that we can pass on to those who buy from us.

Another bit of cynicism—"Loyalty, like gratitude, is a lively expectation of favors to come." There has been a rather naive feeling that loyalty of the buyer meant coming back as a customer regardless! Nay, nay. True loyalty, like parental love, chasteneth.

It is due to the seller to bring it sharply to his attention when he has failed to come up to or beyond the average. There has grown up a system of extraneous services which have been and are very costly. The buyer has paid for them. When the use of automatic and semi-automatic machinery, and high capacity cutting steels, was in its infancy the services were justified. To-day, he who demands them pays for them and they should not be a general charge on all buyers.

No buyer is interested in anything in his purchase that he cannot sell. Any other service his dollar buys is sheer waste, from a profit standpoint.

Determination of Needs

One of the largest expenses of the seller is that of searching for business and selling. Just as those who buy from you must pay for this, so do you pay for the expense to which those who sell to you have been put. This is particularly interesting, because that additional expense is an item for which there is no tangible equivalent, but which must be passed on to the next customer. If your competitor has found a way to eliminate this, there is only one fund to pay it from—the profit account.

Day after day salesmen tell customers: "If you need it, you pay for it, whether you get it or not." Perfectly logical, is it not? If the material being sold would save them money, they are paying for it and more too—and the profit account shows the loss. If the machine offered is needed, but not bought, the operating and capital account show the expenditure, but inventory and profit account are shy.

Day after day salesmen are saying it to you. And they are proving it. Sometimes it takes three, four, five, even twenty years to prove it. Talk to your own salesmen about their experiences, and check back on that last piece of apparatus purchased, that proved up so handsomely, and see when it was that the salesman handling that line of machinery first approached you on the subject!

You finally came to it and are now enjoying the fruit of it, but how are you going to get back the profits lost through not buying when you first needed it?

Knowing What the Market Affords

The market? How many of us have any realization of the extent of the available supply?

In a little village in Massachusetts is a real buyer. For twenty years he had patronized a small section of the earth for a certain material. He bought in New

York from one of three or four jobbers, who in turn bought from three or four German firms. Without doubt they were his best suppliers. For years they had faithfully met his requirements. Having a canny knowledge of the world, and being a real citizen of it, he knew what was happening in 1914, and went into the markets of the world.

Two years later he showed me curiously marked and odd sized barrels and boxes from the interior of China, from India, from Honduras, from Spain, from the Dutch East Indies. Yes, and there were packages which came from New York and California, from Canada and Mexico, and from all between.

Have you asked your salesmen to tell you of their experiences from 1914 to 1921? How purchasing agents, superintendents, owners, came to them seeking this and that? Asking how certain operations could be done. What machines would do the work best, what substitutes could be used for some material to obtain this effect or that? In New York men ran around with rich contracts in their hands, eagerly hunting for men to take them. Some paid three and four prices for second-hand machinery, and begged for supplies.

That was the test of the advancement of purchasing art in this country. Overloaded and at sea, forced to listen to wild demands, and wildly searching for assistance, much of our purchasing talent lost its head and neglected the commonest assistance. Ask your salesmen what purchasing agents they assisted, just by searching the index of THE IRON AGE and turning to the proper page.

Do they remember how cordially they were thanked, and how their word was taken as that of a priest, when they gave information about some other fellow's line—and the dark looks of suspicion when they told of machine capacities, delivery situation and probabilities in their own line?

Conditions have changed. No more do salesmen avoid factories because they cannot make deliveries. Once more they are combing the highways and byways for business. It is once more a buyer's market, but the necessity of purchasing is not relieved. Nor are the rewards of intelligent buying less than they were.

To-day's Opportunities

As the market is world wide, competition will be world wide. Sellers and buyers do not fully realize this. As sellers, how many of us look out of the beaten path for business? How many have considered going away from home to supply other needs? How many have investigated other industries, and far away sections of this country, to see what they have and want?

Who sells us, and from whom do we buy? Do we know what this country affords in materials? Do we know from whom they are to be obtained? Do we know the relative values of materials of different kinds? Do we know the trade practices, how they work to our advantage and how to our disadvantage?

If the foundry now supplying your castings burns up, and your patterns with them, do you know who could turn out patterns for you in the shortest possible time, and whom you could call upon to deliver castings of superior quality?

Suppose the "Old Man" were to bring home a contract to make a new line of machinery, to fit a new mill, to be running before the sugar cane is ripe.

Where will you get the extra drafting and design talent? Who has equipment and shop facilities you can use to supplement your own? Who can supply the special materials necessary in this work? How will you go about to obtain the information you do not know?

How can you send out information of your wants to the concerns specializing in supplying materials for this work—concerns of whom you have never heard?

How will you check up to find the reliability of your new suppliers?

It is not a repeat order. It is a chance to make a single profit, and to fill in the present gap in production, he has seized. Some additional machines will be needed. Second-hand ones will do. Who has them? Where can you find out about them? Who is reliable?

French Investigation of Rail Failures

Causes of the Increasing Number—Effect of Exfoliation —Rapid Corrosion of Rails—Segregation and Poor Quality Metal

IN *Le Genie Civil* for Nov. 19, there is an article taken from a paper on rail failures by the eminent French investigator, Charles Fremont, who was led to carry out this work because of the frequency of rail failures in France. It is estimated the number in France is 2500 to 3000 per year. Records show also

detached, leaving a fissure which gradually increases and divides the head of the rail, as shown in Fig. 2.

The question arises whether the exterior fissures are the cause of the interior cavity or, on the other hand, whether the interior fissure is not formed first and finally reaches the surface. To determine this,

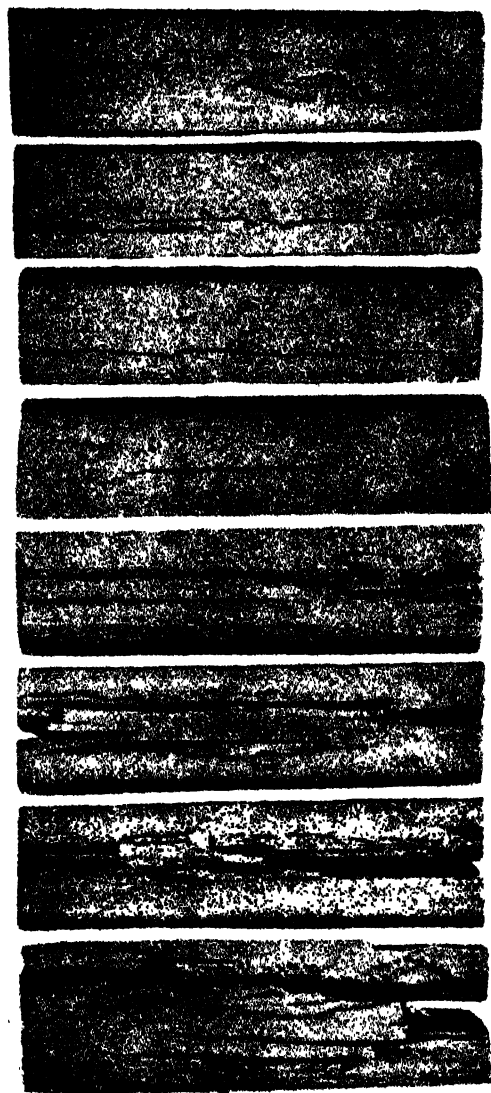


Fig. 1—Exfoliation or Scaling of French Steel Rails

the number to be increasing, on some systems such as the Midi and L'Est, at a rapid rate. The rapid corrosion of certain rails in tunnels he finds to be due to the presence of non-metallic inclusions in the metal. This corrosion is also a cause of rapid wearing away because it reduces the useful rolling surface.

Exfoliation of French rails is shown by the samples in Fig. 1, which exhibit this scaling in different degrees. At the beginning small longitudinal fissures are seen on the running surface. These fissures elongate and join. Often only one line is seen, as shown in the third sample, then later a second line at a distance usually of 1 or 2 cm. Sometimes these two lines appear at about the same time, the part between them is gradually

Fig. 2—Formation of Surface Fissure and Split Head

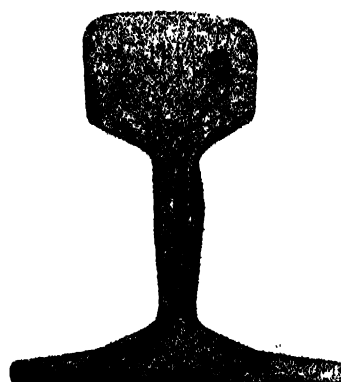
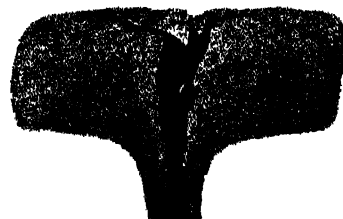
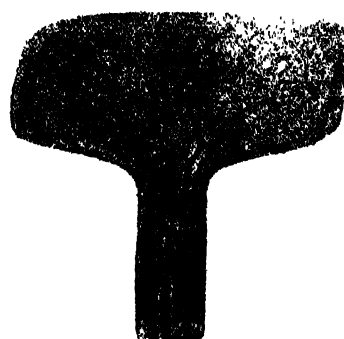


Fig. 3—Large Interior Cavity in French Rail

Fig. 4—Blister from a Pipe



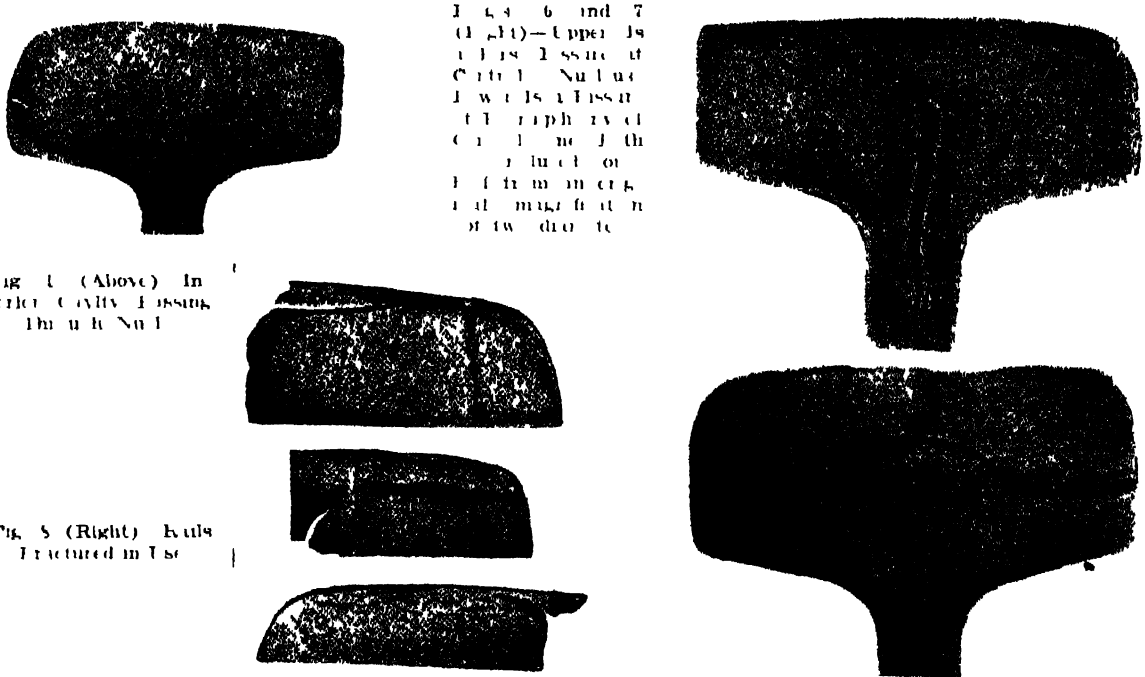
cross sections show that wherever the exterior fissure is found, even when very small, an interior cavity is always present; and sometimes wide cavities are found, as shown in Fig. 3, which have not yet reached the surface. The beginning of such a defect is then always in the interior of the rail. In cases where not sufficient discard is taken the pipe is reduced to a fissure. Fig. 4 shows the section of such a rail in which this fissure, enlarged, has formed a blister in the web. In other cases the internal fissure, especially that in the head, does not come directly from the pipe cavity. After etching the section it is seen, Fig. 5, that the fissure passes through several nuclei of impurities. In this case the fissure is produced by the effects of shock

from the passing trains Mr. Fremont believes it comes from segregation of the metal and depends on the distribution and composition of this segregation.

The distribution of this segregation in the heads of the rails takes widely variable forms. Sometimes it is condensed in a central compact zone distinct from the sound metal. At other times the central zone is surrounded by nodules of small nuclei. It may be divided into secondary nuclei. Finally the heads of many rails are spoiled by the presence of a zone of

ticular to this rail, and finally caused failure. Experimental tests would indicate that the fissures travel from one small nucleus of impure material to another, as shown in Fig 8 of heads fractured in service.

After a further discussion of the matter Mr. Fremont believes the exfoliation or scaling of the rails to be due to bad initial quality of the steel, and not to fatigue of the metal brought about by cold work, as has been sometimes suggested. Careful tests with a specially designed hardness measuring device show



blowholes parallel to and a little distance below the surface.

All these zones of impurities, almost concentric are the cause of various defects. Figs 6 and 7 give two examples of failure in which the influence of the central zone can be seen. Fig 7 shows a central nucleus of good material but surrounded by a segregated zone from which emanate the radial fissures that are par-

that the cold worked material on the head only extends in 0.14 mm, and even with a softer rail the depth was only 0.23 mm.

The article closes with a description of superficial quenching of the metal of the rolling surface, as mentioned in a recent report by Mr. Howard, and the danger of the cracks in this hardened layer extending through the rail if the metal is not sound. C. B. W.

Budget of the St. Louis-San Francisco Railway Co.

The budget of the St. Louis-San Francisco Railway Co. for 1922 providing for considerable buying has just been completed. President Kurn, writing to THE IRON AGE says:

"Our 1922 budget does not provide for any additional locomotives but we do contemplate purchasing eight 70-ft. all steel coaches and six 70 ft. all steel chair car, which equipment is to be used in two of our important through main line trains.

"We propose to lay approximately 185 miles of new 90-ft. rail, but all of this rail is on hand or contracted for.

"On shop tool and machinery we figure on expending approximately \$200,000, most of which is in the nature of machinery for maintaining equipment and consists of engine lifting traveling cranes, steam hammers, forging furnaces and miscellaneous mill shop machinery. The largest single item contemplated is the erection of a 200-ton electric traveling crane at our West Shops, Springfield, Mo. This crane will enable us to handle our Santa Fe type locomotives much more economically than at the present.

"So far as additional shop buildings are concerned, we have nothing in mind for the present year except a few minor extensions to round houses.

"We propose to do considerable grade reduction at Crocker, Garnsey and St. John, Mo., where grades will be reduced for a distance of 162, 150 and 357 miles respectively at an estimated cost of \$675,000, and we also contemplate the construction of 175 miles of second main track from Windsor Springs to Valley Park, Mo., which will give us double track from St. Louis to Valley Park, where our traffic is exceptionally heavy, due to the number of regular freight and passenger trains and suburban trains which operate in this territory. Between Spring Hill and Paola, Kan., a distance of 127 miles, we are going to construct the second main line which will give us double track from Kansas City to Paola. Our traffic in this territory is exceptionally heavy, due to the M. K. & T. using our track between these two points. We have already asked for bids from responsible contractors on the two pieces of double track and the three pieces of grade revision."

A joint convention of the Indiana State Sheet Metal Contractors' Association and the National Sheet Metal Contractors' Association will be held May 15-19 at Indianapolis, in the Cadle Tabernacle, a building that seats 10,000 persons. One of the features will be the sheet metal products exposition. All of the space for the exposition has been taken. Joseph Mattingly, president of the Indianapolis association, is one of the committee on arrangements.

Operation of Oil-Burning Steam Plants

Discussion of the Plant Characteristic Diagram, with Particulars Regarding Its Use in the Establishment of a Standard of Performance and in Increasing Plant Efficiency

BY C. H. DELANY*

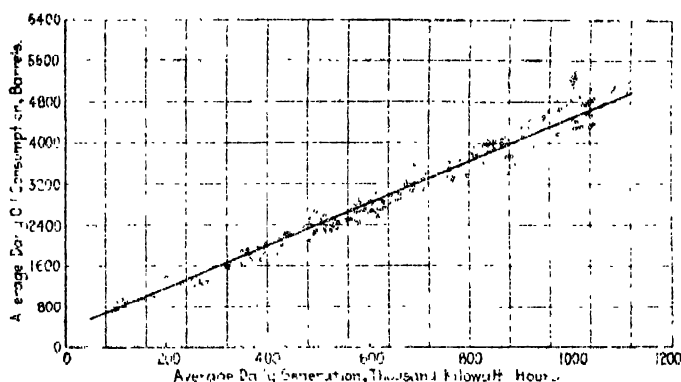
TEN years ago there were many plants operating reciprocating engines, in which the maximum performance obtained was not over 150 kwhr. per bbl. of oil. With the high-pressure steam-turbine plants of to-day a record of 330 kwhr. per bbl. has been made. This increase in efficiency has been brought about by introducing more efficient machinery and increasing the range of steam pressure in the prime mover. The introduction of the steam turbine to replace the reciprocating engine effected a remarkable saving in fuel. Moreover, the steam turbine caused a saving in operation due to the fact that its operation does not depend on the personal element in the plant.

In reciprocating engines there were many adjust-

of kwhr. generated per bbl. of oil. This is an excellent method of comparing one day's operation with another, provided there is steady load on the plant and conditions remain the same from day to day. With a variable load, however, such as occurs in an ordinary central-station plant, it is always found that the economy is much better at periods of heavy load, and poorer at periods of light load. Thus it is possible, with a fairly heavy load on the plant, to secure from 220 to 230 kwhr. per bbl. of oil without difficulty, whereas with the same plant operating at a light load, it may be difficult to secure more than 150 kwhr. per bbl. of oil.

When the good results are obtained with the heavy load, the operating men consider results better than the average. On the days of light load, when the results are poor, they do not worry but say, "What's the use, you can't expect any results with such a light load." Thus in neither case is there any incentive to improve the economical operation.

Another reason for more or less lax methods, so far as efficiency is concerned, is the fact that efficiency must always be secondary to continuity of service. The men know that any interruption to service will be a matter of close investigation on the part of the management, and they devote all of their energies to maintaining the plant in operation and keeping the lights burning. For instance, if a fireman in endeavoring to adjust carefully the air supply in his boilers neglects to keep up the steam pressure, with the result that the turbine slows down and some of the load has



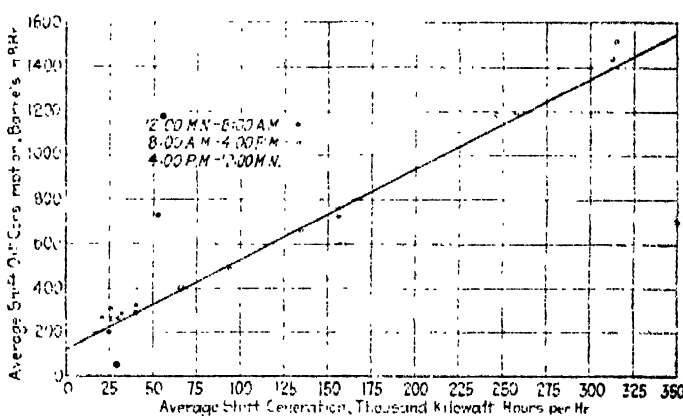
Plant Characteristic Diagram for a San Francisco Station

ments to be made by the engineer in charge, and the economy obtained depended very largely on his skill and the care with which he made these adjustments. With the steam turbine, however, there is nothing that the operator can do to improve the efficiency, after the machine is once installed and placed in good operating condition. While this is true as regards the prime mover, it is not true in regard to many other features of the power plant.

In the boiler room, particularly, there are many points where the operating engineer can effect a saving if he carefully studies the situation and pays attention to the small details. In condensers and vacuum pumps also a great saving can be made if proper attention is paid to maintaining a high vacuum. There is still, therefore, a large field for the operating engineer in improving the economical operation of the plant, and the question of operating efficiency is consequently one worthy of careful study.

Many tests have been published showing high efficiency of boilers fired with fuel oil, efficiencies as high as 80 and 82 per cent being not uncommon in test reports. It is very rare, however, that any such high efficiencies are obtained in the regular operation of power plants. To maintain high efficiency in regular operation, the first requisite is some means of comparing one day's operation with another.

In oil-burning electric power plants it is customary to report the economical operation of the plant in terms



Plant Characteristic Diagram with Scale Altered to Show Results Obtained on an 8-Hour Shift

to be dumped, he is sure to be called on for an explanation. If, on the other hand, he keeps up the steam pressure, but neglects to regulate the air in the proper proportion, there usually will be no complaint; and the boilers may be allowed to operate in this inefficient manner for a considerable length of time.

The author is far from disputing the fact that continuity of service is a matter of prime importance, but he does wish to point out that efficiency is a close second. The problem before us, therefore, is so to interest the operating men in the matter of efficiency that they will not neglect the various operating details that must have attention to secure good results.

To improve these conditions and to interest the men in the problem of efficiency, it is essential to devise

*Pacific Gas & Electric Co., San Francisco; abstract of a paper presented at a joint meeting of the San Francisco sections of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

some means of comparing the performance of a plant from day to day. For this purpose, the diagram here called the "plant characteristic diagram" has been plotted.

Such a diagram, as shown for one of the San Francisco stations, consists merely in plotting the oil consumption against the kwhr. generated. Each point in this diagram represents one full day's operation, and while the points as shown are more or less scattered, it is apparent that they form a well-defined line. It is thus possible to draw a straight line through the midst of these points in such a way that it will represent the average location of all points in the diagram.

Use of Diagram as Standard for Guidance

Having once been drawn through the points as described, the diagonal line may be used as a standard

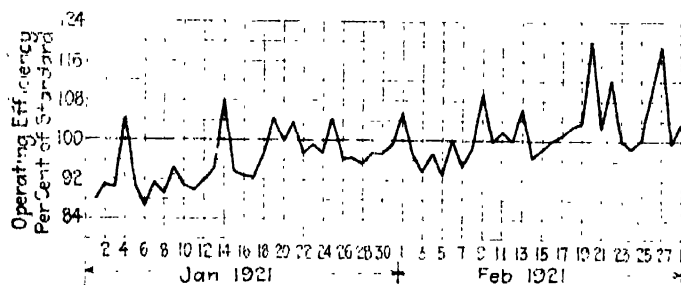


Diagram of Operating Efficiency of a Plant Over a Two-Months' Period

for the guidance of the men in future operation of the plant. Thus each day the kwhr. generated and the oil burned the day before may be plotted on this diagram. If the point so plotted falls below the diagonal line, it is evident that the results obtained are better than the standard. If the point falls above the line, too much oil has been used, and something requires a special investigation. Since the diagram takes in all loads from zero up to the full load on the plant, it allows for the poor economy obtained at light loads. It is thus possible for the operating men to know immediately whether they are keeping up to the required standards of efficiency or running behind. They can therefore investigate causes of low efficiency immediately, while all matters entering into the plant operation are fresh in their minds.

In adopting the standard it would be possible, instead of drawing a line through the average of the points, to draw a line through the best points, thus establishing a standard that would represent the best results yet obtained from the plant. Again, it would be possible to establish a higher standard by drawing a theoretical line below all of the points, this line to be based on the steam consumption of the turbines and auxiliaries, as determined by tests, a boiler efficiency of, say, 80 per cent and the best possible vacuum; in other words, a line representing ideal conditions.

In adopting the average line as the standard it is felt that the men will have greater confidence in the method than if a theoretical line had been adopted. The average line is really a standard that has been established by the men themselves. It is not an arbitrary ideal impossible to attain, but as it represents the average already attained, it should be as easy to improve on the results represented by the line as to fall below them.

If the men are successful in improving on the standard each day, it is obvious that the average for a given year will represent better efficiency than the average for the previous year. With all of the points falling below the line on the diagram, another line drawn through the average of these new points would also fall below the original line.

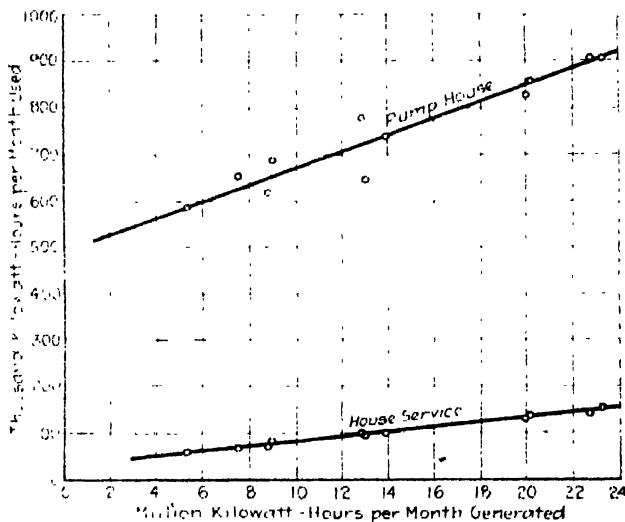
A similar diagram, but with the scale altered so as to show the kwhr. generated and the oil burned during a period of 8 hr. instead of 24 hr., may be used by the different shifts in the station, so that each shift can check up its own performance and compare it with the performance of the other shifts. A large diagram of this form is posted on the wall of the fire room, and

different colored pins to represent the different shifts are inserted each day, so that the diagram shows at all times which shift is running above the line and which below it. This system has a far-reaching effect in awakening interest, and leads to such rivalry and competition to improve the efficiency that the laxity which previously existed is disappearing.

Operating Efficiency Determination

There is one objection to the diagram—it does not indicate the order in which the records are plotted, and therefore does not show whether the results are improving as time goes on.* To overcome this objection, and also to enable the operation of different plants to be compared with each other, the term "operating efficiency" has been introduced. Operating efficiency as used in this connection means the percentage of standard attained for the day's run. "Operating efficiency" is entirely distinct from "boiler efficiency" or "turbine efficiency" or "thermal efficiency" or "Rankine-cycle efficiency." All of these enter into the operation of the plant in determining the standard. Operating efficiency is merely a comparison of the results, actually obtained, with the standard.

Determining operating efficiency can best be shown by an example: During one 8-hr. shift there were generated 313,000 kwhr., and 1440 bbl. of oil were burned, representing 217 kwhr. per bbl. From the diagram it is found that for a load of 313,000 kwhr., with standard efficiency, there would be burned only 1400 bbl.



Power Used by Electric Auxiliaries in a Station, Plotted Against the Total Generation

of oil, which would be equivalent to 224 kwhr. per bbl., as against the actual result obtained of 217 kwhr. per bbl. The operating efficiency is therefore 97 per cent. During another 8-hr. shift, where there were only 25,000 kwhr. generated, the oil burned was 200 bbl., equivalent to 125 kwhr. per bbl. From the diagram it is found that for 25,000 kwhr. with standard efficiency the oil burned would be 220 bbl., equivalent to 114 kwhr. per bbl. This operating efficiency is therefore 110 per cent. It is thus seen that, although in the second case there were only 125 kwhr. per bbl. obtained, as against 217 in the first, the operating efficiency was actually higher in the second case.

This method of determining operating efficiency makes allowance for inefficient machinery, for it is just as easy to obtain 100 per cent operating efficiency in a plant having old-fashioned turbines of poor design as in a plant having the most up-to-date machines, for the standard is based on the actual records of the plant itself.

One chart shows operating efficiency plotted for

*There is a second: it does not distinguish between a day or shift during which the average kwhr. and the maximum kwhr. are nearly the same, and one during which they vary heavily. In the former case the results should be much better than in the latter. [Editor.]

each day during the months of January and February. In this diagram, the horizontal line at 100 per cent represents standard efficiency, and the zigzag line the actual operating efficiency obtained each day. The records show a gradual improvement during the period, which is a direct result of the attention to small details brought about by this method of checking up efficiency.

Since the diagonal line in the plant characteristic diagram is usually a straight line, it can of course be represented by a simple equation, namely:

$$y = a + bx$$

where y is the oil consumption in a given period in barrels or pounds, x the kw-hr. generated in the same period, and a and b are constants.

Evidently the constant a is equal to y when $x = 0$. In other words a represents the quantity of oil burned for zero load; that is, the amount required to keep up steam on the boilers, keep the turbine running up to speed, operate the vacuum pumps, circulating pumps and other auxiliaries, and keep the entire plant in readiness to take on load at a moment's notice. Obviously a will be larger if two turbines with their auxiliaries are kept in operation than only one, so that its value depends on the amount of load the plant is expected to take on. Where a plant is operated as a standby to a hydroelectric system and is kept in readiness to pick up its full load instantly in case of trouble, a will have a higher value than where it is possible to shut down the turbines gradually, one after the other, as the load falls. The constant b evidently represents the additional amount of oil burned in proportion to the load carried on the plant. It determines the slope of the line in the diagram, and is large for uneconomical turbines or engines and small for the most efficient types. The equation of the line for an 8-hr. shift, in terms of barrels of oil and kw-hr., is

$$y = 120 + 0.0041x$$

Other Uses of the Diagram

The diagram may be used for many other purposes besides the overall efficiency of the plant. By plotting the steam generated against the oil burned in one diagram, and the steam consumption against the kw-hr. generated in another, it is possible to study the boiler-room and engine-room operations separately, and thus quickly locate the cause of low efficiency. By setting separate standards for the boiler-room and engine-room crews, responsibility can be more definitely fixed, and the advantages of the system of operation greatly enhanced.

Since boiler efficiency usually decreases rapidly as the load increases above the boiler's rating, a single boiler will naturally have a curved characteristic. In a plant containing a large number of boilers, however, the boiler-room characteristic will be approximately straight until the load exceeds the economical capacity of all the boilers in the plant, after which it will begin to curve upward. A curved line, based on previous performance, is just as satisfactory as a straight line for setting standards and calculating operating efficiency in the manner described. A last diagram shows the power used by electric auxiliaries in a station, plotted against the total generation, and is of interest in showing that the points do form well-defined straight lines, and that the same methods may be used for standardizing these items as for fuel consumption and steam consumption.

To sum up, the essentials for securing the best efficiency in power-plant operation are:

1. A fair standard by which the daily performance can be measured and compared with previous results, at the same time giving the operating men a definite goal to which to work.
2. Means of comparing results obtained by different groups of men, such as different shifts of one plant or the crews of different plants, and the posting of this comparison so that the men can see the results of their efforts.
3. A system of reports that keeps up the interest of the men, combined with suggestions and advice that show where losses occur and how they may be avoided.

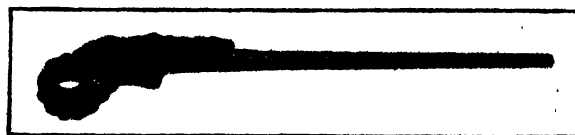
If the operating men are kept interested, see the

results of their work, and have a definite standard to reach, they will do their best. As interest flags, some sort of bonus or prize for the crew showing the best operating efficiency will stimulate them to greater effort, and by guiding this effort by means of thoughtful analysis of the technical features of the power plant, maximum efficiency may be obtained.

New Chain Pipe Wrench

An improved chain pipe wrench made in seven sizes for pipe and fittings from $\frac{1}{8}$ to 16 in. in diameter is being offered by the Armstrong Brothers Tool Co., Chicago. The illustration shows the wrench equipped with flat link chain; cable chain is also supplied.

The improved design is intended to eliminate some of the weak points of the usual tool of this kind, especially the tendency of the jaws to work loose on the bar, resulting in spreading of the rear end of the jaw and wedging of the chain. Increased bearing of jaw sockets upon the bar, combined with two hardened chrome-nickel steel bolts are said to effectively hold the jaws in place under the most severe usage. The rear



Improved Chain Pipe Wrench

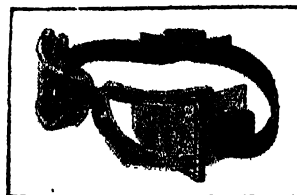
bolt is located directly under the chain socket where the spreading strain is greatest.

Chain guides are provided on the jaws. The handles are forged from high carbon steel and the jaws are drop forged from special steel, treated and hardened.

New Eye Protector

The goggle shown in the illustration is a recent addition to the line of eye protectors offered by the Chicago Eye Shield Co., Chicago. It is known as style No. 220 and is intended to permit of unusually wide range of vision and comfort.

The special features are the lens-retaining bar which is locked with the headband and the collapsible



The Lens Retaining Bar Is Locked with the Head Band

and adjustable nose bridge which permits adjustment of the goggle to the correct pupillary distance of the wearer. The goggle is regularly furnished with a rubber binding which provides a smooth bearing against the face.

Ericsson's Monitor to Be Commemorated

A DeLamater-Ericsson commemoration, with the unveiling of four bronze tablets, will be held March 9, the sixtieth anniversary of the battle between the Monitor and the Merrimac. One of these tablets will be fixed to the site of the residence of Captain Ericsson, Beach Street, New York, with the ceremony in charge of the American Society of Swedish Engineers. Another will be raised on the site of the Phoenix foundry, where some of Ericsson's work was done; another at the Cunard pier No. 54, the site of the DeLamater Iron Works, and the fourth at the Continental Iron Works, Brooklyn. A banquet will be held at the Waldorf-Astoria Hotel, New York, and a simultaneous banquet will be held in Stockholm, Sweden. Further information may be obtained by applying to H. F. J. Porter, of the DeLamater-Ericsson Commemoration Committee, Engineering Societies Building, 29 West Thirty-ninth Street, New York.

Disintegration of Blast Furnace Linings

Split Furnace Shells Undoubtedly Due to Expansion of Zinc-Impregnated Linings—Remedies Suggested

BY PAUL O. MENKE*

WITHIN recent years blast furnace men have become more or less alarmed over the repeated failures of blast furnace linings. In some districts it is no uncommon occurrence to burst furnace shells; in fact it became such a regular thing at one plant, that it has led to the design of a very ingenious banding lug for banding shells whenever they show signs of giving way. The first few failures were confined to a certain well known brand of steam pressed brick. Shortly afterward, other well known and popular makes of furnace linings began to give out. All of these early failures were confined to steam pressed linings, but recently there has been found disintegration in some well known hand made linings. The probable reason that the failures have not been more numerous in the hand made brick is on account of the popularity of steam pressed linings.

Poorer Brick Not Wholly Responsible

There is no doubt that the quality of most of the popular brands of fire brick has greatly deteriorated during the last five or six years, principally due to careless and inefficient labor, over which the maker had no control, but some of this is probably also due to mixing in some inferior clays. The proportion of plastic clay was increased beyond the usual ratio. The flint clays were ground finer in order to make a nice looking brick; in fact most of the furnacemen in recent years have laid too much stress on getting a smooth, nice looking fire brick that would lay up with minimum cutting and labor. Nevertheless, all of these changes do not account entirely for the trouble.

Early last year, while visiting a large Eastern plant, the author's attention was drawn to some shell failures. Some of these were light shells, but one of them was built out of 1 in. plate, well riveted and butt strapped—in every way a first class job. It had a steam pressed lining laid against the shell without any packing space. This shell had started to split vertically several sheets above the mantle. At the time, this was attributed to the probable expansion of the steam pressed brick.

On looking over the shell, some matter was noticed at the point of fracture which looked like a deposition of zinc fumes. On having the deposit analyzed, in addition to taking a drilling through the crack and having some of this brick material analyzed, zinc was found.

Several Furnaces Examined

Shortly afterward, there occurred a very bad shell failure with fatal results, which was generally attributed to an explosion. As this mishap was so unusual, and of such fatal consequence, it alarmed most all of the furnacemen who heard of it. Photographs of this wreck seemed to show the action of zinc impregnation

and disintegration. The manager insisted there was no zinc, as he did not use any zinc bearing raw material. Examination of the furnace revealed a distinct vertical separation and cleavage of the remaining portion of the inwall and although no metallic zinc was found particles of zinc oxide were discernible in this cleavage. Later analysis of the brick material showed zinc to be present in the oxide, chloride and metallic state, as high as 40 per cent down to 0.15 per cent.

With zinc impregnation as high as shown in the analysis presented, it does not seem unreasonable at all, knowing the terrific strain that a zinc saturated lining exerts, that it split this shell, particularly as it was water cooled. A splash jacket prevented the operators from promptly detecting any signs of the splitting of the furnace shell. With the shell split it would not necessarily take a very heavy slip to put on enough additional strain to tear horizontally and open up.

Some furnaces that had been banked for several months were shoveled out. One of these had a considerable "belly" in the lining, extending from the

mantle to 30 ft. above the mantle, reaching less than one-third of the way around the furnace. The brick was well glazed and hard for a depth of 4 to 12 in. back to the inner face of the lining. Beyond that, was a zone of separation and spalled cleavage for a distance of $\frac{1}{4}$ in. to 2 in. This space was filled with zinc oxide, metallic zinc and large carbon deposits; zinc oxide from 2 to 20 per cent. Beyond that, for a distance of 2 to 4 in., the brick was disintegrated and crumbly, saturated to the extent of 0.03 to 6.82 per cent of Zn. Beyond that point, extending to the shell, the brick was firm and in a good state of preservation, with practically no zinc impregnation. The balance of the lining seemed very good, and had worn back less than 2 in.

Two test holes through the good lining back to the shell, opposite the bad place, disclosed no disintegration. The face of the brick was glazed and firm, and really harder than it would be in the original state. Metallic zinc appeared in the joints, also some oxide of zinc about 12 in. back from the inner face of the lining, but this had in no way penetrated the brick.

Some spray cooling on the outside of the shell on the thin spot of this furnace may have been the cause for disintegration at this point. This furnace was lined up with the same make of steam pressed brick that had given more than 800,000 tons during the preceding blast, and was in good serviceable condition when blown out.

On finding this condition at this furnace test holes were cut above the mantle at another furnace that had been lined up with the hand made brick of a popular make. This lining had been stored over five years, so must have been made at a time before disintegration of furnace linings had become alarming. The inner face was glazed and firm for a distance of about 4 in.

*Superintendent of blast furnaces, Shenango Furnace Co., Sharpsville, Pa.

From there on, zinc was found, both metallic and oxide, and disintegration to the extent of making the brick soft and very easy to cut, to within 4 or 5 in. of the shell. The conditions were identical at the two opposite points of the furnace. However, the holes were plugged without further repairs, and this furnace is operating to-day.

On the strength of these observations some of the more prominent cases of disintegration were made the subject of closer investigation. In one particular case where two linings had been lost zinc was found up to 18 per cent in this brick. Considerable of this was metallic, but apparently was not blamed for the disintegration of these linings.

Zinc Evidently the Cause of Failure

Our own experience in this matter has been expensive, and the cause of great delay. Nine or ten years ago, on account of low phosphorus content, our furnaces had used a proportion of Blue Billy agglomerates in our burden. First a shell split on the smaller furnace which had seen considerable service. This shell had to be renewed. Within two years a larger, newer furnace opened up her shell both in the vertical and horizontal seams, in the heavy section. We promptly banded this furnace. She burst these bands until we put on 12 by 1½ in. bands, very closely spaced. After that, the pressure sheared the horizontal seams of the shell, and showed swellings and distortions on the side of the furnace. This furnace was excessively water cooled in the bosh, and also had cooling plates above the mantle. Most of the trouble and breaks in the shell took place in the cooled zone. More or less metallic zinc was evident around the bosh plates of the furnace.

When it became necessary to put this furnace out for renewal of stack, it was impossible to blow it down more than thirty-five ft. as it shook so badly as to make it unsafe. On taking this lining out we found the most complete disintegration we ever saw. It was not burned out in any way, but had the full thickness of the lining, in addition to some scabs on the inside. It was not necessary to use any picks or steel bars, but the lining was shoveled out. The full outline of the brick and joints was visible until we got to the water cooled portion, where the zinc showed up, mostly in the metallic form, probably due to the water cooling.

On making an analysis we found zinc up to 49.86 per cent in the lining, and up to 40 per cent in the scab and scaffold. In fact lining and scab were so rich in zinc that it was sold to a chemical company for the recovery of the zinc. A considerable portion above the water cooled section was in the form of chloride of zinc.

On finding this condition, we put up a 1 in. shell, discontinued the cooling above the mantle, reduced the cooling below the mantle, and cut out Blue Billy agglomerates and other zinc bearing material. A steam pressed lining was laid tight against the shell, following the same practice used on our other furnaces with the lighter shells. Results were satisfactory, until we ran into zinc recently. Very probably we would not have encountered any difficulties even then, if we could have kept our furnaces running, but banking, shoveling out and cooling largely aggravate this condition.

Chemical Reaction Quite Simple

It might be well to give a brief outline of the action of the zinc in the furnace. Being charged into the top as zinc oxide, finely disseminated through the ore, it descends unchanged to the fusion zone, as the reduction temperature is 1000 deg. C. and over. The zinc oxide is reduced by solid carbon to metallic zinc; liberated as vapor, it ascends with the gases to the

cooler zones. The zinc is re-oxidized through the temperatures from 1000 deg. to about 500 deg. C., the reaction being $\text{Zn} + \text{CO}_2 = \text{ZnO} + \text{CO}$, and is carried up by the gases as zinc oxide. The larger portion passes out into the stoves, dust catcher, boilers or into the atmosphere. A portion redeposits on the descending stock to repeat the before-mentioned cycle of changes.

Some of the zinc vapor is absorbed by the lining up to as high as 50 per cent. It usually shows up as small yellow crystals. Sometimes it is found with carbon deposits in the disintegrated and laminated portions of the lining. Some of this zinc shows up in the metallic form. It usually is around the water cooled part of the furnace, also in the part of the lining that is not water cooled but had a chance to cool down after banking or blow out.

In scabs that adhere to the water cooled portion of the furnace, it probably combines with the alumina, forming zinc spinel, which is practically irreducible, as these scabs are largely intact, after the furnace has been blown out. It is also generally assumed that the zinc oxide combines with the alumina in the fire brick. As the coefficient of linear expansion of zinc is like 60 to 1, compared to silica, which is the principal constituent in fire brick and is about 3 to 1 compared to steel, it can readily be seen that it would not take a great deal of impregnation to destroy the bond of the brick and exert great expansive stresses. The hand made brick, on account of its greater porosity, has a tendency to take up more of this element than the steam pressed.

Remedies Suggested

Most of the Blue Billy agglomerates carry zinc, which can easily be guarded against, but as some limestones carry traces of zinc, also some of the Lake Superior ores, it makes it rather hard to be absolutely sure there is no zinc bearing material charged into the blast furnace. No matter how low the percentage of zinc is in the raw material, gradual accumulation will cause it to show up in time.

It is hard to see why it should be in any way detrimental to lay a lining against the shell without packing space, and particularly so, steam pressed brick which is a good conductor of heat, and would warm up the shell to a point where it can expand with the brick work. Most blast furnace lining brick should be somewhere near neutral and not subject to a great deal of expansion under heat. By using a heavy shell, (if necessary above 1 in. thick), eliminating the water cooling above the mantle the trouble should be reduced to a minimum. It might also be well for the fire brick makers to make experimental tests to find the resistance to zinc fumes of their various makes of bricks.

Automatic Train Control Devices

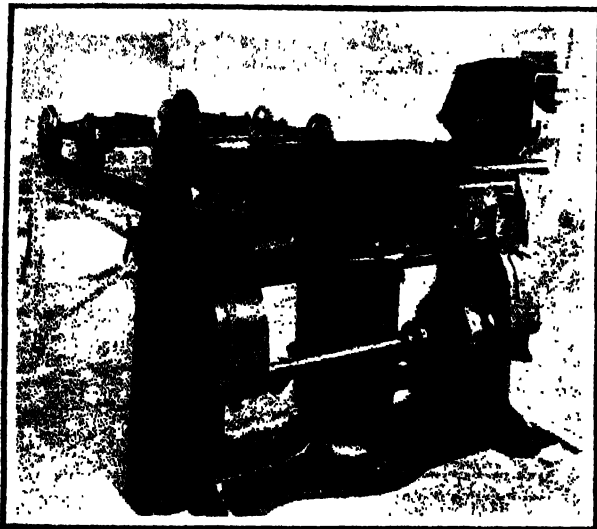
WASHINGTON, Feb. 21 - Taking official notice that parties interested in particular automatic train control devices are giving the impression to the public that it has approved their devices and ordered the railroads to install them, the Interstate Commerce Commission last week issued a memorandum to the press saying that it desires it to be understood that the commission's order of Jan. 10 requiring 49 carriers to show cause why they should not install control devices does not prescribe any type to be used. The only requirement, the statement points out, is that installation shall pass certain technical specifications and requirements which have been found to be necessary for the successful operation of devices of this character. These are so broad, the commission says, through Secretary C. B. McGinty, as to afford the desired freest field of opportunity for inventors and for trying out all automatic control and train stop devices.

NEW OSBORN MOLDING MACHINE

Air-Operated Jolt -- Electrically-Operated Roll-Over Pattern Draw and Run-Out Car

A molding machine equipped with the standard air-operated jolting mechanism, combined with an electrical roll over, pattern draw and an electrically-operated run-out car has been developed by the Osborn Mfg. Co., Cleveland.

The machine is shown in the accompanying illustration. It is compact and self-contained. The mechanism is assembled on a large frame which is cast integral and without bolted parts. The mechanisms are inclosed and where necessary operate in an oil bath. The



The Roll-Over Device Is Electrically Controlled. Pattern draw and run-out car are electrically operated also. Ramming is by compressed air

machine rotates on the approximate center of gravity of the load, an arrangement intended to reduce rolling-over strain. The jolting operation is performed by compressed air at 80 lb. pressure and the jolt controlled by the company's single-piece, air-balance piston-type valve, adjustable to give the desired force of blow.

The roll-over operation is effected by an electric motor transmitting its power through a worm wheel and a pair of spur gears directly connected to a narrow drum for coiling the cable attached to the bottom of the lifting rods. Either push button or manual control is used. The motion is said to be steady and positive and the table, being rigidly held throughout its travel, cannot sway or swing. Although the operation is automatic, rolling over is under control of the operator and may be stopped in any position.

Pattern drawing is by one rolling-over mechanism, but is electrically controlled to secure a speed of only $1\frac{1}{2}$ ft. per min. during the time necessary to loosen and start the pattern. The remainder of the draw is accomplished at high speed. Rolling over, lowering and drawing of patterns are all performed by moving the handle around the marked dial of the controller.

After the mold is rammed and ready for rolling-over, the controller handle is placed at the "rolling-over" position. After the roll, the machine stops automatically. The run-out car is brought into place by its motor and also stopped automatically. The table is locked into position and the controller handle swung to the "lower" mark on the dial. The mold then lowers until it makes contact with the automatic lowering device on the run-out car and stops automatically. The mold is then prepared for drawing by releasing the clamps and setting the vibrators in motion, after which the controller handle is turned to "slow draw." As the slow speed is used only to loosen the pattern, the controller is left at this point only for 2 or 3 sec., after which it is moved to the notch marked "fast draw." The pattern is then rapidly withdrawn from the mold, automatically stopping at the top of the stroke.

In lowering the machine to the jolt position the run-

out car is propelled from under the table to the end of its track. The table is unlocked and the controller handle is placed again at the lowering position, and the table automatically comes to rest on the jolt table. This completes the cycle of rolling over the mold and withdrawing the pattern which, with the jolting operation, makes the total time consumed by the machine per mold approximately 2 min.

The number of blows desired to jolt the mold is predetermined, and by moving the jolt-operating lever to the number of blows desired, the machine will continue jolting, automatically stopping when that number is reached. The machine is easily lifted into place on the foundation by a crane or hoist. Very little assembling is necessary. The foundation is cast in one piece, and since the machine operates on its own center of gravity, it is not necessary for the foundation to be heavy enough to counterbalance over-hanging loads.

Close control is obviously a feature. Among other advantages it is claimed that electrically-operated pattern draw eliminates jerky motion so dangerous to the mold, the speed of drawing being certain and instantaneous; lowering of the roll-over table is begun instantly upon placing the control handle in the lower position; and the motion in rolling over the mold is constant, steady and positive, without strain or shock. When lowering the roll-over table to its jolting position it is unnecessary to start the table rolling by hand.

The machine is built in capacities from 5000 to 20,000 lb. and in various heights and flask lengths.

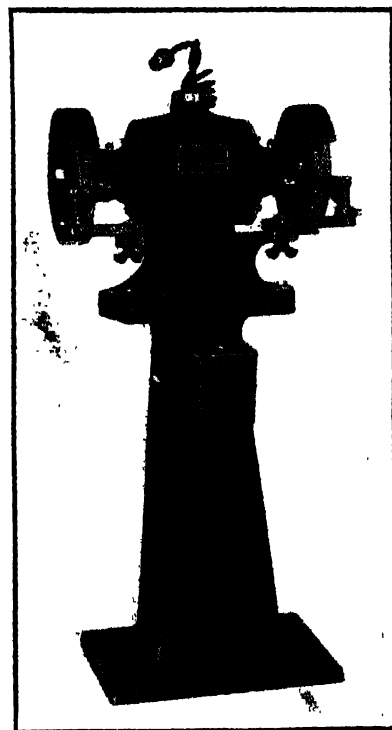
Alternating-Current Grinder

A $\frac{1}{2}$ h.p. alternating-current electric grinder in both floor and bench style has been placed on the market lately by the Standard Electric Tool Co., Cincinnati.

The machine is shown in the accompanying illustration. It is fitted with double-row ball bearings, and

a Westinghouse motor with the latest type of Westinghouse circuit breaker is used. The machine can be equipped for either 110 or 220 volts, single, two or three phase. The grinding wheels are 8 in. in diameter, with $\frac{1}{4}$ in. face and $\frac{1}{4}$ in. hole, and are extended well out from the body of the motor to facilitate the grinding of long and irregular work. The floor type is fitted with a water pot and both types have adjustable tool rests.

The motor is powerful and is quick to start on a single-phase line and a quick make-and-break switch is located on top of the motor within easy reach. Ten feet of re-inforced cord fitted with a plug is furnished, the regular equipment including also one fine and one coarse grinding wheel. The bench type machine weighs 110 lb. net and the floor type, 225 lb.



Grinder for Operation on Alternating Current

The next annual convention of the Southern Supply & Machinery Dealers' Association will be held in Birmingham, Ala., April 24, 25 and 26, 1922, with headquarters in the Tutwiler Hotel.

THE X-RAY IN METAL ANALYSIS*

Some German Results — Work of Von Laue — Detecting Presence of Tungsten

The idea of using the X-ray as an aid in determination of the internal structure of metals followed closely Roentgen's momentous discovery. More than 20 years ago the English scientists Heycock and Neville investigated the nature of alloys by these means. They found that the opacity of metals to the rays was in general closely related to the atomic weight. They therefore made alloys of the light metals, such as sodium and aluminum, with the heavy ones, lead, silver and gold. From these alloys, after rapid or slow solidification, were cut horizontal and vertical slices of about 1 mm in thickness from which X-ray photos were made. These showed in some cases (the sodium-gold alloy for example) a simple separation of the components without the formation of either alloy crystals or compounds. In the sodium-gold alloy the shadows of the sodium crystals and the heavier ones of the gold alloy, both imbedded in the eutectic mixture, give a complete picture of the metal structure.

In considering the use of X-rays in the metallography of iron and steel we are confronted with the fact that the most important elements met with in ferrous alloys, namely manganese, nickel, chromium and vanadium, have atomic weights so close to that of the principal constituent that a practical differentiation of their opacity cannot be expected. Carbon and silicon have indeed less opacity than iron, and separated graphite which is 400 times as translucent as iron will be recognizable in the X-ray photograph. On the other hand the transparency of cementite or the carbide of iron Fe_3C cannot be more than 25 per cent greater than that of ferrite, while the low carbon alloys show still less difference. Under these conditions the X-ray method of analysis cannot compete with the splendidly perfected methods of metallography. For the separation of silicon the conditions are still more unfavorable.

The X-Ray and Tungsten Steels

Only in the case of tungsten steels is it possible that the X-ray method might be preferable to the microscopic. Tungsten has the atomic weight 184 which is more than three times that of iron, while its opacity is 100 times that of the principal metal. The presence of tungsten in steel can be detected even in the presence of pearlite or the double carbide, and indeed in cases where the metal consists of a homogeneous mixture of martensite crystals. In fact, in the latter case a quantitative determination is possible by measuring the depth of shading in an X-ray photograph of the alloy and comparing it with the photograph of a similar strip of soft steel.

The measurement of the depth of shading has been brought to a high degree of perfection, so this method is promising. Other constituents which may be present do not interfere with the result. Molybdenum, for instance, which may replace the tungsten does indeed increase the opacity but not nearly to the same extent as tungsten. Its atomic weight is 96 and its opacity six times that of iron.

On the same principle the lead content of glass or the metal content of copper ore may be determined. The fact that in these cases the metals exist in chemical compounds is of no importance as the opacity is a property of the atom itself and does not depend, as in the case of ordinary light, on the form of combination.

The relationship between opacity and atomic weight is not proportional. The determining factor is not the atomic weight but the place number in the natural system of the elements. Except in special cases where selective absorption of the rays takes place, the opacity which is dependent on diffusion is in general proportional to the fourth power of the ordinate number.

Accordingly the greatest opacity is possessed by uranium and thorium, the least among the solids by

lithium and beryllium. The latter metal is one which should prove itself extraordinarily useful for many most important physical experiments. It has the advantage over lithium that it is unaffected by air. It is less opaque to both Roentgen and cathode rays than aluminum or even water and such organic substances as rubber and paper. Its physical characteristics at low temperature must be very striking. It would doubtless be profitable to produce this remarkable metal on a somewhat larger scale.

Nature of X-Rays

The author comments briefly on the nature of X-rays. A decade or more elapsed after Roentgen's discovery before Barkla, by succeeding in partial polarization of the ray, proved the transverse nature of these ether waves. He also showed the way to their approximate measurement which is 10,000 times smaller than the waves of visible light. At the same time the difference between the penetrating "hard" rays and the more easily absorbed "soft" rays was shown, like that between violet and red light rays, to consist only in the length of the waves. The hard rays have a short wave length and great frequency, the soft rays greater wave length and slower frequency. But are extremely short-waved light.

The greatest step in our knowledge of these rays since 1912 is due to von Laue. His discovery puts at our disposal resources which permit us to penetrate more deeply into the interior of solid bodies than any of the existing methods of metallography.

A well-known means of determining the wave length of light consists in passing a monochrome ray through a lattice of bars placed very close together. The bars deflect the light, which causes to be seen on a screen set up behind the lattice not only the direct effect of the ray, but also a number of reproductions of the same effects deflected to the side. The shorter the wave length of the light to be examined the finer the lattice must be.

To adapt this optical method to the extremely short-waved X-rays would require a lattice finer than could be made by the hand of man. Nature comes to our aid, however. In crystalline structures lattices already exist built up of atoms or molecules, with a constant of 10^{-8} , and it was von Laue's happy idea to use them for the investigation of the rays. These crystal lattices are of a different nature from the Rowland gratings used for spectroscopic measurements. They are not only crossed but consist of a whole system of such crossed gratings placed one behind the other. Laue's discovery was the foundation of a new epoch in crystallography in the midst of which we now are. The art of making the plates has attained a high degree of development and a rich mass of data has been collected.

We await with great interest the result of experiments as yet unfinished on metallic alloy crystals in which the presence of a second kind of atom in the lattice introduces disturbances of the electrons, made manifest in a lessening of the diffraction of the electrons and with it of the electrical conductivity and a change in the mechanical properties, such as increased hardness, etc.

Possibly the investigation by the aid of the X-rays, of materials which play such an important part in industry will throw light on the causes of the principal characteristics.

F. E. N.

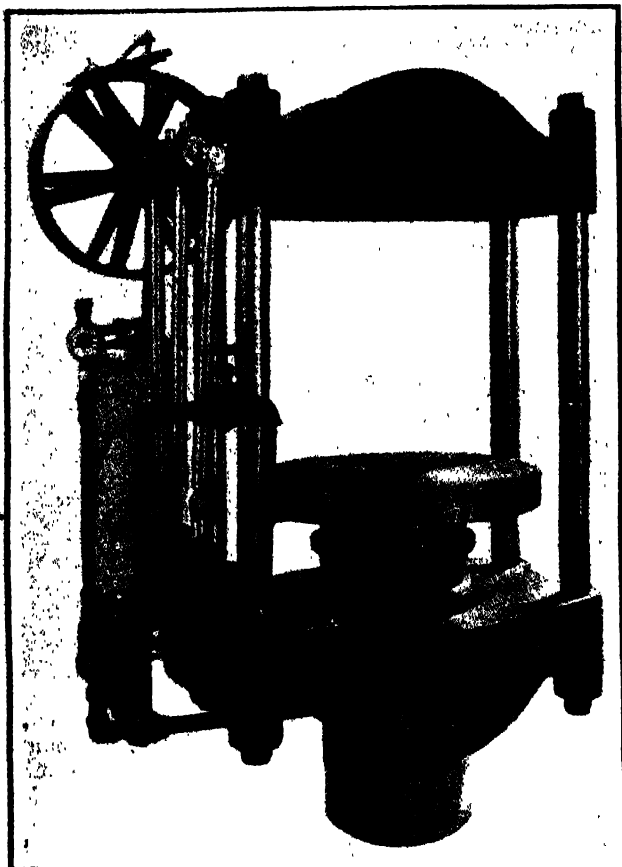
Business conditions, according to a survey of current business issued by the Department of Commerce, are improving. The preliminary survey for January states that the iron and steel industry is still without definite trend, though activity in certain lines was greater than in December. Although the automobile industry showed the usual seasonal dullness, marked interest was exhibited in the shows, and greater activity in the tire industry gave every prospect of a satisfactory season. Industries depending upon rural purchases have shown little recovery, and cannot be expected to show much until the new crop year. This is particularly true of agricultural implements.

*From Dr. R. Schenck in *Stahl und Eisen*, Oct. 13, 1921.

Press for Tires and Other Uses

A new 250-ton hydraulic press designed primarily for forcing solid rubber tires on and off truck wheels, but adaptable also for a variety of other uses, has been brought out by the West Tire Setter Co., Rochester, N. Y.

The frame or resistance pieces are of cast steel. The top platen is of steel, cast solid with the top resistance piece, the bottom platen being also of steel and removable from top of the ram. The area of the



The Distance Between Platens Is 37 In. and Horizontal Distance Between Strain Rods, 43 In.

ram is said to be sufficient to produce the required tonnage with comparatively low initial pressure, thus permitting longer life of valves and other working parts. It is claimed that where this press will use 2000 lb. initial pressure, other designs frequently require 5000 lb. initial pressure.

The pump is of the 3-plunger type with automatic cut out for large plunger and has one 2-in. low-pressure plunger, for throwing a greater volume of oil, to fill pipes and cylinder quickly. When about 200 lb. pressure has been obtained the larger plunger is automatically cut out by a special by-pass valve, leaving the two smaller plungers in operation for completing the higher pressure required for maximum tonnage.

The vertical measurement between platens is 37 in. and the horizontal measurement between strain rods, 43 in. The diameter of the platens is 42 in. and the travel or stroke of ram, 33 in. The bore of the cylinder is 16 in. The height from floor line to top of pulleys is approximately 7 ft. 3 in. and the overall height, approximately 9 ft. 3 in. The strain rods are of 4½ in. round steel.

New Safety Code for Use in Grinding

A new safety code for the use, care and protection of abrasive wheels has recently been approved by the American Engineering Standards Committee and released for publication, the date of approval being Feb. 11. This code has been in the process of preparation for about two years. It was prepared under the rules of procedure of the American Engineering Standards

Committee and has as its sponsors the International Association of Industrial Accident Boards and Commissions and the Grinding Wheel Manufacturers of the United States and Canada. These sponsors appointed a sectional committee to draft the code, consisting of 28 members representing various branches of both Federal and State Governments, several national manufacturing associations, a number of individual employers, associations of employees using grinding wheels, several technical societies, insurance associations and others interested in the manufacture or use of grinding wheels. Dr. L. W. Chaney of the U. S. Bureau of Labor Statistics is chairman and A. Rousseau of the Norton Co., secretary of the sectional committee.

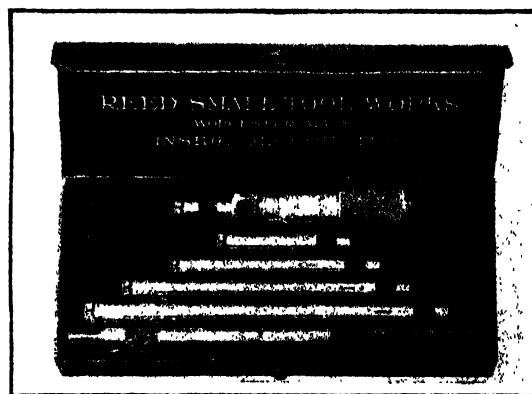
The new code is said to be a distinct improvement over the codes previously issued by the grinding wheel manufacturers, and contains much information not found in any other publication. The size and scope of representation of the organizations sponsoring and endorsing the code give it an air of authority which cannot but commend it to the careful consideration of everyone interested in any way in grinding wheels.

The code is now in the hands of the printer and will be ready for general distribution about the middle of March. Copies can be obtained from any grinding wheel manufacturer on request.

New Inside Micrometer

The Reed Small Tool Works, Worcester, Mass., has placed on the market the inside micrometer caliper shown in the accompanying illustration. The barrel, spindle and thimble have the same diameter as the corresponding parts of the company's outside micrometer, large surfaces allowing for generous sized figures on the barrel and spindle.

A feature of the tool is the detachable handle, easily and quickly adjustable, making it convenient for right or left hand work. Measurements can be made in inaccessible places or the entire length of a cylinder bore can be gaged. With a range of one inch, time



The Detachable Handle Is a Feature

lost, while in actual use, is less than with tools having a smaller range. Extra rods, fitted with anvils, are intended to permit of quick change with little possibility of error. The rods are interchanged by unscrewing from a threaded stud at the end of the barrel and each rod is internally threaded and ground square at the hardened end, which sets squarely against the barrel shoulder. At the point of measurement the rod is fitted with a hardened tool-steel anvil, adjustable for lengthening the rod and compensating for any anvil wear. Anvil faces are ground on a comparatively small radius, making the tool especially adaptable for measuring parallel or curved surfaces.

The Pittsburgh-Des Moines Steel Co. has consolidated its structural and plate sales departments and W. W. Hendrix, who for some time has had charge of plate sales, has been placed in charge of the consolidated division. Mr. Hendrix, who has been with the company for 20 years and is vice-president, now has the title of assistant general manager of sales and sales manager for the Pittsburgh territory.

NO BONUS BILL

Belief in Washington That the Measure Cannot Be Passed at This Session

WASHINGTON, Feb. 21.—Predictions are being freely made in official quarters that there will be no bonus legislation enacted at the present session of Congress. It is apparent that the interminable controversy over this largess to soldiers will be passed on to the next session and the legislation indefinitely postponed. At present there are indications that the House may jam the measure through at the current session purely as a matter of supposed political expediency, realizing that the Senate and the President favor postponement of action.

There is a strong element in the House, manifestly at variance with the Administration, who would like to return to their constituents at the forthcoming fall election as sponsors of a bonus regardless of how the money should be raised. The Administration is insistent that the bill shall include a plan for obtaining the revenue and has recommended a sales tax. The Chief Executive has announced himself in favor of a production tax to be collected at the source because of its so-called simplicity of collection and equitable distribution. The agitation for a retail tax apparently has not impressed the President, for he has expressed the belief that it would be too complicated and would involve more expense in collection than a manufacturer's tax. The President refrained from suggesting the rate which could be levied at the source, but it is said that he would approve a 1 per cent tax on wholesale sales of manufacturers' products. It is estimated that approximately \$350,000,000 could be obtained annually from this source and this would be sufficient to meet the demands of a cash bonus plan.

The agricultural bloc in Congress is strongly opposed to the sales tax plan. It is supported in this view by the American Federation of Labor. Business interests of the country, as Congress is well aware, are opposed to any kind of bonus legislation because of its serious economic effects. The attitude of agricultural interests is reflected by the statement of T. C. Atkeson, representative of the National Grange, in a formal statement to Congress. He said "The Grange is opposed to the introduction of the new principle of taxation variously known as sales tax, consumption tax, manufacturers' tax or turnover tax in any form and by any name, and considers the effort to enact it into law indefensible, wrong in principle and designed to shift the burden of taxation from those most able to pay, and receiving the greatest benefits to the shoulders of those least able to pay, and receiving the least benefit from the Government. The National Grange has suggested an excess profits tax for the bonus." He pointed out that, should this be inexpedient, a tax should be levied which will not be added to the cost of living of the millions with limited incomes. The President is unalterably opposed to the restoration of the excess profits tax, which proved so burdensome to business and industry. It is generally conceded that a levy on manufacturers' products could not be added to prices paid by ultimate consumers. Business men feel that it is not feasible to raise prices at this time. They also realize that they are the first to feel the effects of extra pressure from taxation in diminution of profits and would undoubtedly be compelled to absorb this assessment through narrowing of the margin of profits. Judging from the volume of protests received by Congress from business interests it is evident they are convinced that the study of the economic effects of a bonus by the legislators is exceedingly superficial and that the political side only has been considered.

January Fabricated Steel Business Relatively Good

In January 72,100 tons of fabricated structural steel work was contracted for throughout the United States, against 71,500 tons in December and 63,000 tons the monthly average for 1921. In January, 1921, the total was only 32,000 tons, but in January, 1920, it was 135,000 tons. Taking into account the hesitation evident in consummating investment enterprises, the fact that January is slightly better in tonnage than December may be significant. In the last ten years January has always shown a falling off from December with two exceptions, 1913 and 1914. January bookings for a decade have averaged 82,800 tons, while December bookings have averaged 111,200 tons. Thus January is about 15 per cent better than the 1921 rate and not quite 13 per cent under the January rate. February has normally been 10 per cent better than January.

The statistics of the volume of business taken by the bridge and structural shops of the country are those of George E. Gifford, secretary of the Bridge Builders and Structural Society, 50 Church Street, New York. The January business indicates that 40 per cent of shop capacity was covered, the total monthly capacity being put at 180,000 tons.

Improvement in Michigan Foundries

BATTLE CREEK, MICH., Feb. 20.—Considerable improvement in the business of Michigan foundries was reported at the quarterly gathering of the Michigan Foundrymen's Association, held last week in Battle Creek. A. W. Blodgett, secretary of the organization, made the report to that effect.

Mr. Blodgett stated that at one time during the summer of 1921 business had dropped as low as 20 per cent of normal, but that at the present time it is 35 per cent of normal.

G. T. Pimpton, Cleveland, led a discussion on the subject of the "Universal Iron Contract." It is a uniform iron purchasing contract designed for use

between the foundry and the furnace companies and which has been drawn up and submitted by the National Association of Purchasing Agents.

Other matters discussed were a uniform cost accounting contract and the important research work that is now being done by the University of Michigan along lines of particular interest to the iron industry.

Reorganization of Commonwealth Fuel Co.

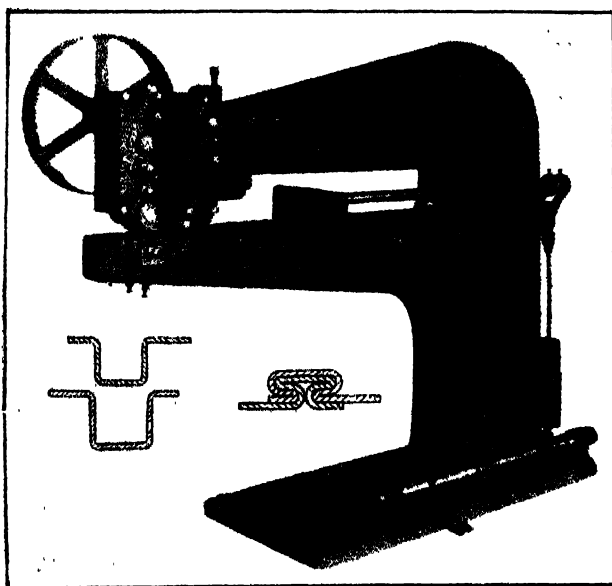
PITTSBURGH, Feb. 21.—Announcement is made of a reorganization and an increase in the capitalization in the Commonwealth Fuel Co., principal offices of which are in the Oliver building, Pittsburgh, with branch offices in Philadelphia, New York and Clarksburg and Morgantown, W. Va., a result of which is that W. G. Ireland, for the past 10 years sales manager the Jamison Coal & Coke Co., Pittsburgh, becomes financially interested in the company and has been elected its vice-president. The Commonwealth Fuel Co., which was incorporated and began business in 1913, owns and operates a mine in the Fairmont, W. Va., district and acts as sales agent for several bituminous operations, including the Simpson Creek Coal Co., and the Maryland Coal Co., with properties in West Virginia. George Paull, president of the Commonwealth Fuel Co., is a director in those companies. The company will continue to conduct a general brokerage business in coal and coke and will handle sales in this district of foundry coke produced from coal from the Jamison mines in the Greensburg basin, recently taken over by the Keystone Coal and Coke Co. Officers of the Commonwealth Fuel Co., in addition to Mr. Paull and Mr. Ireland are J. P. Fife, secretary and J. H. Roelofs treasurer. Robert Dickey is sales manager.

The Danbury Mill Supply Co., Inc., 37 Liberty Street, Danbury, Conn., which was recently incorporated to deal in mill supplies, machinery, etc., has chosen the following officers: President, George A. Seagrave; secretary and treasurer, Winfield S. Holman, who is in the plumbing and heating business in Danbury.

Compound Seam Closer

A machine for producing a side seam tighter and more substantial than the single lock seam has been developed recently by the Niagara Machine & Tool Works, Buffalo. It is shown in the accompanying illustration and is known as the No. 42 compound seam closer.

The seam produced by the machine can be filled with sealing compound to make it air tight, although the seam is said to be practically air tight without the filling. Calcium-carbide drums and calcium-chloride cans are examples of containers requiring air-tight



Offsets Are Formed in Double Crank Press and the Sheet Rolled to a Cylinder and Placed over the Horn

seams and the machine is especially adapted for this class of work.

The offsets shown in the left hand insert are formed by dies in a double crank press. The sheet is then rolled to a cylinder and placed over the horn of the seam closer, with the offsets laid on the guide piece set into top of horn. The machine runs continuously and therefore does not require tight and loose pulleys or a clutch. By depressing the treadle connected to the sliding gage, the work is moved forward along the horn, and fed between the first set of rolls, which squeeze the seam together at the bottom. After these rolls take hold, the body feeds automatically through the machine. The next set of rolls flatten and thereby close in one operation the double lock seam, shown in the right hand insert.

The machine weighs approximately 2700 lb. The pulley is 20 in. in diameter, 3 in. face and is run at 100 r.p.m. The maximum length of work that can be seamed is 42 in., the minimum diameter of the longest work being 12½ in. Shorter diameters, for work of short length, can be seamed. The capacity is given as No. 22 gage soft steel and lighter.

Patent Office Bill Now a Law

WASHINGTON, Feb. 21.—President Harding last Saturday signed the Lampert patent office bill. Now that the measure has become a law, much to the gratification of industrial, engineering and other interests of the country, salaries in the patent office will be increased, and the force of examiners and other employees expanded in order to relieve the congestion of work. The measure also is expected to check the resignations of experts, who as is well known, receive totally inadequate salaries.

The bill passed the Senate last week, after having been previously passed in the House, without any opposition and in the exact form in which it came to the Senate. It was in charge of Senator Johnson, chairman of the Committee on Patents.

"Familiarity with the patent office demonstrates the necessity of the bill," said Senator Johnson. "Increase in business has been so disproportionate to aid accorded the office that it has fallen far behind. The receipts of the office are sufficient to justify additional expenditure and make unnecessary draft on the treasury."

St. Louis Companies Merged

The Hagen Metal Products Co., 119-127 Bowen Street, St. Louis, and the Western Screw-Products Co., 3219-25 South Broadway, St. Louis, have been merged. The combined interests are capitalized at \$125,000, and business will be conducted in the name of the Western Screw-Products Co., which is the older of the two companies.

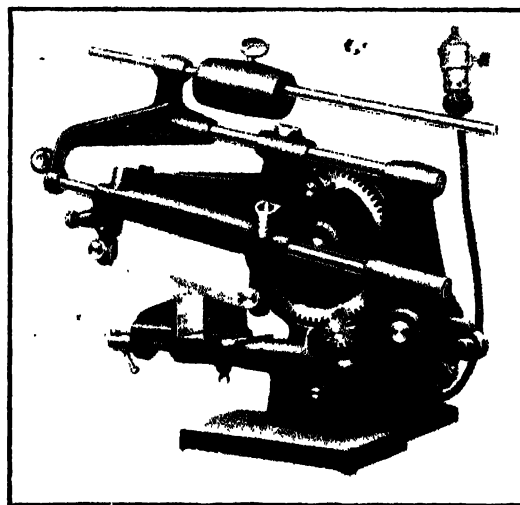
Jos. J. Hagen, president Hagen Metal Products Co., since its organization in Detroit in 1919, and who was secretary and treasurer of the Western Screw-Products Co., prior to that time, has assumed the management of the combined interests.

The company specializes in screw machine products, cap screws, plain and castle nuts and light metal stampings. The officers of the Western Screw-Products Co., are as follows: Jos. J. Hagen, president; Jno. T. Soy, vice-president; Herman Giesecke, secretary and treasurer.

Portable Power Hack Saw

The bench hack saw shown in the accompanying illustration has been placed on the market recently by the Edlund Machinery Co., Inc., Cortland, N. Y.

The machine is of the portable type, intended to eliminate the labor of hand sawing and to handle a large share of the work usually done on larger machines. It cuts tool and machinery steel efficiently



Cutting Is Done on the Backward Stroke

and is especially adaptable for use in tool rooms and machine shops.

Power is supplied by a small motor, direct connected, the power being transmitted through cut gearing. The machine can be attached to any electric light socket. The cutting is done on the backward stroke, the saw blade being relieved automatically on the forward stroke, an arrangement intended to diminish the wear and prolong the life of the blade. The feed is regulated by a weight, which can be instantly adjusted for various cuts and sizes of work from the lightest tubing to the heaviest bars.

The saw arm when raised for placing the work is held automatically in position until released by the operator. The machine also stops automatically when the cut is finished and can be stopped or started at any time while the cut is being made. Any standard 8-in. blade can be used and the blades can be easily replaced without the use of tools.

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THE IRON AGE

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Steel Production Costs

It is common knowledge that many of the steel mills have been losing money in the past few months, but the remarkable thing is that the losses are not greater. The losses are chiefly of overhead, i. e., a mill fails to earn all its overhead expense, but if it were idle, it would have an overhead nevertheless. There are, of course, losses in depreciation of inventory, but those are caused by extraneous conditions and are not chargeable to operation.

Speaking generally, comparisons of selling prices lately ruling with prices obtaining before the war and in the early months of the war, with allowance for known and inescapable increases in various items of cost, such as freight rates and wage rates, indicate that in some respects steel is being produced more economically than before the period of inflation, or the losses would be larger than are being reported.

There are two expensive factors in present operating conditions whose influence is not commonly appreciated, the low operating rate and the very mixed character of the specifications being filled. Before the war, it was considered almost impossible, from the profit and loss standpoint, to operate the average mill at less than about half its capacity, but of late many mills have had to contend with a much worse operating rate than that.

The other condition, the mixed specifications that have to be filled, is well understood by all who have any familiarity with mill operations, but is given little thought by the average buyer of mill products. It is the natural and unavoidable consequence of the hand-to-mouth buying, on the most conservative scale, that has characterized the market for months past. The buyer is unwilling to wait for delivery until a convenient and economical rolling schedule can be made up, but insists on immediate attention, and if one producer will not agree to almost instant rolling another producer will. In all the ups and downs of the steel market in the past, managers have noticed the sudden increase in costs that comes when orders run short, and the sudden drop in

costs that occurs when it becomes possible to schedule mills a little distance in advance.

With the various handicaps existing, the showing of efficiency and economy made by the mills is noteworthy. In many respects, perhaps minor individually, but important in the aggregate, steel mills are undoubtedly being operated more efficiently than before the war. The efficiency of labor is not excluded as an item in this connection, for there are cases in which a direct comparison can be made between results in 1913 and results to-day, showing a greater labor efficiency at the present time.

Further decreases in costs and increases in efficiency are to be expected, although there can be no sudden improvement except such as may come from enlarged operation and better scheduling of rollings. No further general reduction in wages seems at all probable in the near future, although there may be readjustments in spots. The "general freight rate reduction" that used to be looked upon as a certainty, the time only being in doubt, now seems likely to come rather gradually.

Some reductions may occur of such character as to be considered more or less "general," but, if so, they will not be large. If the rate makers consider this matter with an eye to the traffic producing possibilities of reductions, they may well turn their attention to iron and steel scrap rates, which are in many cases too high to permit scrap to move. Scrap dealers point out that there are piles of scrap that can be looked at, ocular evidence that traffic movement can be developed. The holders can afford to wait, for the interest cost of holding is practically nothing.

Steel prices are now so low, considering all conditions, that no decreases in production costs are likely to appear in recognizable form in changes in selling prices. Steel prices are not fixed, but they are as nearly stabilized as can possibly be expected in the circumstances.

One of the striking effects of the steel depression of 1921 has been the decline in the output of electric furnaces making steel ingots. It has been out of all proportion to that in either open-hearth or Bessemer steel. The slump in the

electric ingot output began in August, 1920. In December, 1921, the production was less than half that of January of the same year or 1539 tons contrasted with 3629 tons. In January, this year, it fell still further to only 822 tons, which compares with 10,687 tons in January, 1920. While the open-hearth output last year was about 50 per cent less than that of 1920, the electric steel ingot production was hardly one-sixth of that of 1920. Compared with 1913, when the American electric steel industry was in its infancy, the present rate of operations is less than it was then and, in proportion to capacity, it is less than the Canadian production.

Changes in European Steel Industry

Several captains of the American steel industry have made trips to Europe, but none has brought back a more comprehensive or interesting analysis of conditions in the European steel industry outside of France, than the one published as an interview in THE IRON AGE of Feb. 16.

Two significant facts stand out from the result of the intimate talks of this traveler with nearly 300 steel men of Europe. In Germany the 48-hour week, and in Holland and Belgium the 45-hour week, legally prevail. In those countries, as well as in England, the 8-hour day prevails throughout the steel industry, even in the operation of blast furnaces and open-hearths, with three 8-hour shifts. The conviction prevails everywhere that labor conditions and wages will not return to the pre-war levels, but that a new era is dawning.

The other fact is a corollary of the first. It being admitted that labor is to be more expensive than before the war, European steel men, in order to compete with each other and with America, must lower costs by the modernization of equipment and the adoption of every possible labor saving device. Larger blast furnace units and improved open-hearth and rolling mill equipment are being widely discussed and in some cases planned. Even the ancient conservatism of British pig iron makers has collapsed and they confess that a change is necessary. Conditions generally in those countries are pointed to as paralleling those in the United States before the war and as likely to remain so. These industries, therefore, face new conditions in the future.

With taxes high and likely to be so for some time to come, with labor more expensive and on a changed basis, with transportation and fuel charges high and with economic and metallurgical conditions radically changed both in Germany and England, those industries are sure to develop along new lines with the ultimate result of larger capacity units and labor saving devices. The effect on the American steel industry cannot now be measured, but the competitive conditions of 1913 and 1914 have disappeared. The introduction of the 8-hour day in those steel industries may have its bearing on the American and perhaps cause its introduction here. In any event the progress of these changes will command the careful attention of American iron and steel makers.

Two pertinent facts characterize the copper export movement in 1921. Sales to foreign consum-

ers were the largest for any year since the war, exceeding both 1920 and 1919 by a liberal margin, and they were over 60 per cent of the 1913 exports. In a year of acute depression and light exports in all other products of the American steel and metal industries, this record is noteworthy. The other striking fact is the heavy purchases by Germany of American copper last year. According to official data just made public, German purchases were not only the largest of any other country, but they were in excess of those of France, Great Britain and Japan combined. German consumers bought about 39 per cent of the total exports and, if Holland's receipts be credited to Germany, this amount would constitute over 44 per cent of the total. Before the war, or in 1913, Germany took only 33 per cent of American copper exports, largely, as a preparation for war. The renewed movement reflects not only the acute need of copper in Germany, but is an example of what a country can do under the handicap of a depreciated currency.

Progress in Steel Welding

That rapid strides have been made in the fundamental principles of welding metals, so that the practice is more of a science than an art, is clearly an inference from an article in THE IRON AGE last week on welding rods. In the early stages of welding steel and even up to recently, the practice consisted too often in filling a steel weld with whatever rod was ready at hand. This often resulted in poor or weak welds and in a prejudice against the art in general.

Much research has been conducted recently both on the correct mixture of gases and the proper distribution to attain controllable temperatures as well as on the kind and composition of the rod which is to supply the welding metal. Attention has also been paid to the use of proper fluxes, as well as to the needs in obtaining a high grade weld, of being certain that the base metal and the welding rod are fused at the proper temperature to insure a thorough mingling of the metals. It has been conclusively demonstrated that to obtain a weld as good or better than the original metal it is necessary to use a rod of a composition which will produce a joint better than the original or base metal. To attain this rods of various compositions, including nickel steel, manganese steel and other alloys, have been developed. Their judicious use in the hands of experts is producing results hitherto unexpected.

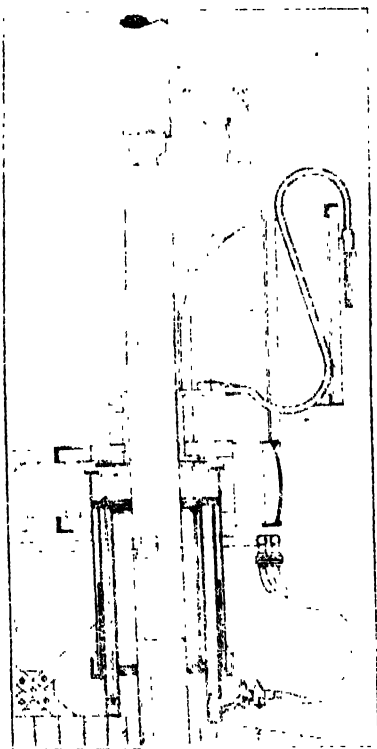
It may safely be said that the art of welding has developed to a stage where, by controlling the temperatures, the materials and the fluxes, furnace conditions originally existing in the actual manufacture of the metal are imitated as nearly as possible at the welding point, to the decided improvement of the welded portions. Reinforced by modern practice and apparatus in heat treatment as well as by new magnetic devices, already in use or in prospect, for testing the reliability of welds, it is probable that still more advances may be looked for, not only in steel but in brass, copper and other non-ferrous metals.

CORRESPONDENCE

Joint for Electric Furnace Electrodes

TO THE EDITOR: Mr. Moore in his very interesting report on the present development of the electric furnaces, (THE IRON AGE, Sept. 22, 1921) emphasizes very intelligently the great importance which should be given to the furnace heat losses.

In most cases the heat loss is increased due to the poor joint between the furnace frame and the electrodes. Few electric furnaces on the market possess such a tight joint at the electrodes as to prevent air flowing through, especially when the furnace is pour-



Section of Electric Furnace Electrode Holder to Indicate Scheme to Secure Air Tightness of Joint

ing. This air current not only cools off the furnace interior, but causes injury to the electrodes.

Mr. Moore gives as an example the Stobie electric furnaces (England) which has an improved electrode joint, but I think that the Fiat electric furnace has solved this problem by the use of a patented device which was developed after many years of study and experience. By using this device on six Fiat furnaces of 5 and 6 tons capacity in our foundries at Turin, we saved 650 kw. hr. of power and 3 kg. of electrodes per ton of steel, and with the furnaces cool at the start. This device gave so tight a joint that the efficiency of the furnace was greatly increased and the use of a larger electric current and electrodes was made possible. Another saving was made in extending the life of the refractory furnace lining which was destroyed often before the adoption of this device.

This device is protected in the United States by patent No. 1,320,884, Nov. 4, 1919, and by other patents throughout the world.

Fig. 1 shows a transversal section of a 5-ton Fiat furnace and the general design and assembly of this joint device. A steel bridge mounted on the sides of the furnace, supports the three electrode housings which are made out of a cooled steel cylinder. Inside of the cylinder a series of insulated rings acts as guides to the graphite electrodes and prevents it coming in contact with the metal wall of the cylinder. At the top of the cylinder a large asbestos disk is fixed, sup-

ported by a metal ring, over which is placed a bell shaped flange attached to the external steel covering. An opening is made at the center of this covering to allow the electrode to pass through. The current terminals for the electrodes are attached to the top of this covering by means of insulated disk and bolts. The movement of this covering is made by two bolts on the side and the electrodes are adjusted by a combination of gears driven by a small electric motor. This motor is operated by a drum controller located on the switchboard.

All parts of this device are accessible to be cleaned or inspected. The entire outfit forms a completed unit which can easily be placed or removed from the furnace by a small hoist.

This device can be attached to almost any type of electric furnace and will shortly pay for itself. With our 6-ton furnaces, manually charged, we can do nine charges in 24 hr. operation.

The Fiat electric furnace works are at the present time using electric furnaces of 5 to 20 tons capacity in their foundry shops. Knowing the results obtained from all the furnaces equipped with this Fiat joint device here in Italy, especially in the steel car wheel industry, which is rapidly progressing. I thought the readers of THE IRON AGE would be interested.

DR. ALFREDO STROMBOLI.

General Commercial Manager of the Fiat Electric Furnaces, Turin, Italy

Warwick Furnace Characteristics

TO THE EDITOR: My attention has been called to the article in your issue of Feb. 2, relating to the Warwick furnaces, and to certain statements made therein. The Warwick No. 2 furnace plant was built under the designs and supervision of my firm; furthermore, my firm had been the engineers for the Warwick Iron Co. for several years prior to the construction of No. 2 furnace. It may, therefore, be safely assumed that I am familiar with the conditions that controlled the design of the furnace lines adopted in both the old and the No. 2 furnace.

It is faint praise, indeed, to state that a man of the initiative and scientific attainments of Edgar S. Cook determined the lines of No. 2 furnace by a "proportionate enlargement of those of the older stack," as stated in the article; furthermore, such a statement is incorrect. The lines adopted for No. 2 furnace were the result of many conferences on the part of Mr. Cook and myself, in which the operating result of several furnaces 100 ft. in height were carefully considered and analyzed.

At that time six 100-ft. furnaces designed by my firm were in use, and the results of their operation were at our disposal; i. e., No. 3 Lebanon (the first furnace 100 ft. in height built in the east), Nos. 1 and 2 Lorain, Nos. 2, 3 and 4 Jones & Laughlin Eliza Furnaces. The lines adopted for Warwick No. 2 furnace were as follows: hearth 14 ft., bosh 21 ft. (not 22 ft., as given in the article); angle of bosh 72 deg., stock line 14 ft. and height 100 ft. On the other hand, the lines of the old Warwick furnace were of the following dimensions: hearth 10 ft.; bosh 16 ft., 4 in.; angle of bosh 74½ deg.; stock line 11 ft. and height 70 ft.

It is, of course, difficult to realize, under present conditions of furnace practice, that Mr. Cook's proposal to make 500 tons of foundry iron per day, in one furnace, was regarded as impossible by most blast furnace managers. Progress and initiative, however, were among Mr. Cook's ruling characteristics, and modern furnace practice is indebted to him in many particulars. Contrary to the statement contained in the article in question, the lines adopted did give expected results, and no difficulties were encountered other than those prevalent at modern furnaces, during that transition period in furnace practice.

The furnace was blown in Oct. 8, 1901, and no changes whatever were made in the lines or plant, until the furnace was blown out for relining in 1904,

when the following lines were adopted: hearth 15 ft., bosh 22 ft., angle of bosh 75 deg. and stock line 15 ft. In the relining of 1907 the lines were changed to provide the following: hearth 15 ft. 6 in.; bosh 22 ft. 6 in.; angle of bosh 75 deg. and stock line 15 ft. In the relining of 1911, the lines of 1907 were repeated, except that the bosh and stock lines were made 23 ft. 6 in. and 16 ft., respectively. Mr. Cook's active participation in the management ceased in 1912. At no time has the furnace been blown out except for the replacement of wornout linings.

It is an interesting fact that, except for relining periods, No. 2 furnace plant has been in continuous operation since it was first placed in blast in 1901. and further, that the original linings of the firebrick stoves are still in use.

I do not have the latest figures at my disposal, but from Oct. 8, 1901, to Dec. 1, 1920, Warwick No. 2 furnace had produced 2,663,257 gross tons of pig iron. When the depression of 1920 developed, No. 2 furnace was continued in blast and is at the present time in blast, whereas the new furnace described in the article was blown out in December, 1920, after about four months' operation, and is still out of service.

Reference is made in the article to the replacement of the Hugh Kennedy stoves at the old furnace by "those of larger dimensions and of a center combustion type;" it may be well to add that the latter stoves are of my three-pass design and are built under my patent.

FRANK C. ROBERTS, C. E.

Real Estate Trust Building,
Philadelphia, Feb. 9.

Scrap Dealers Ask for Lower Freight Rates

WASHINGTON, Feb. 20.—Iron and steel scrap dealers appeared to-day before the Interstate Commerce Commission in connection with the general rate investigation and asked that the 40 per cent advance in freight charges made in August, 1920, be removed. This is the same request as was made by most iron and steel manufacturers when the hearing was opened.

H. F. Masman, traffic manager for the National Association of Waste Material Dealers, who asked reductions of rates in all kinds of so-called waste materials, said that scrap iron and steel should take the pig iron rate instead of the billet rate as both are raw materials used in the production of steel.

J. L. Low, manager of the freight department of Briggs & Turivas, Chicago, submitted exhibits to show pig iron rates are lower than scrap iron and steel rates, but conceded that the carriers had made some adjustments recently. He asked for removal of the alleged discrimination in rates against scrap and then elimination of the general 40 per cent advance.

It was said that practically no scrap is moving from Eastern points to the central district, because of high rates, and that the business is demoralized because 70 per cent of the scrap used at Youngstown must move from distant points.

A. B. Alpirin, an Omaha scrap dealer, asked for specific reductions in rates from Omaha to Chicago, St. Louis, Kansas City, Denver and Peoria, Ill., ranging from 20 to 50 per cent. He said that 60 per cent of the scrap dealers in the small cities of Nebraska are out of business.

A jury in Pittsburgh pared \$265,318 from the claim made by the Crucible Steel Co. of America against the city of Pittsburgh for damages sustained to its property fronting on West Carson Street as a result of widening that thoroughfare and raising it from the flood level. The company asked \$292,318 but the jury awarded it only \$27,000.

The Richardson & Boynton Co., Dover, N. J., manufacturer of stoves, ranges, etc., is arranging to transfer a number of local plant departments to its works at Buffalo, N. Y., including molding, tin and sheet metal operations. The change is being made owing to continuance of local labor troubles.

Belgium's production of spelter in December, 1921, is reported to have aggregated 7370 metric tons.

DISTRIBUTION OF OVERHEAD

Industrial Cost Association Considers Merits of Productive Hour and Machine Rate Method

A paper on "Overhead Distribution Methods" was presented at the Feb. 16 meeting of the New York section of the Industrial Cost Association at Keen's Chop House, New York, by F. Brugger of the Pittsfield works of the General Electric Co. The discussion following centered chiefly upon the relative merits of the productive hour method and the machine hour rate method of figuring costs.

In defense of the machine hour rate method in a modified form, a representative of the De Laval Separator Co. explained how that company had, after investigation of both methods, introduced a greatly modified machine hour rate method, with what, up to the present, appears to be satisfactory results. In a department of 70 machines, large and small, operating on different kinds of work and on which, by way of illustration, about \$2 per hr. was formerly charged as overhead, under the new method of figuring, an overhead on the smaller machines of 30 cents to 40 cents per hr. was shown, and up to as high as \$5 per hr. on the larger machinery. As a result the company began to consider the advisability in some cases of turning certain of this larger work over to other shops.

The questions of tax, insurance, light, heat and power charges were discussed and the proper methods of charging these items, as well as the value of charging interest on the investment in a machine against overhead, as part of the operating expense.

There was some disagreement over the proper method of figuring overhead in dull and active business years, Mr. Brugger preferring the establishment of a normal overhead, to be evenly distributed over dull and active periods, arguing that business activity and depression occurred in cycles and should be so considered. Those in opposition pointed out that there was no good reason for making a period of two or three years prosperity pay the overhead run up by one year of depression.

The board of directors for the coming year was unanimously elected, the board being vested with authority to elect the officers of the organization. The elections to the board were as follows: H. D. Starr, assistant comptroller New Jersey Zinc Co.; C. A. Porter, comptroller Hardinge Co., New York; J. H. Ramsey, auditor, Electro-Dynamic Co., Bayonne, N. J.; Addison Bonen, Yale & Towne Mfg. Co., Stamford, Conn.; R. W. Matter, office manager Jenkins Mfg. Co., Bloomfield, N. J.; F. B. Van Vleet, general auditor Ruberoid Co., New York; Durlyn Wade, Jr., general auditor Cross, Austin & Ireland Lumber Co., Brooklyn, N. Y.

Midvale Shuts Down Munition Departments

The armor plate, gun and projectile departments of the Nicetown works of the Midvale Steel & Ordnance Co. have been shut down, following the recent action of the Conference on Limitation of Armament in restricting the naval building programs of the United States and other countries. About 400 men were thrown out of employment.

No plans have been announced as to the use to which the idle departments may eventually be put.

The Niles Steel Products Co., Niles, Ohio, formerly the Allsteel Supply Co., has developed the production of stampings and pressed metal parts. It is located very advantageously in the Mahoning Valley for its source of supply, being surrounded by sheet, plate and strip mills. Besides its regular factory building, it has, in the past year, added a warehouse and office building. It has a completely equipped machine shop of sufficient size to supply and maintain dies for its press department. It also has a well developed department to furnish agricultural implement seats and other stampings used by implement manufacturers.

Opposition to Foreign Valuation Plan

Action of Senate Committee Members Not Favorably
Regarded by Iron Trade—Arguments Presented by
John A. Topping for American Valuation

BY L. W. MOFFETT

WASHINGTON, Feb. 21.—The iron and steel trade being on record in favor of the American valuation plan as a principle for basing tariff duties will applaud the steadfast opposition of Chairman Fordney of the House Ways and Means Committee to the foreign valuation plan, which, to the disappointment of the trade and American manufacturing interests generally, has been tentatively agreed upon by the Republicans of the Senate Committee on Finance. Mr. Fordney has made the flat statement that if the Senate sends the permanent tariff bill over to the House based on foreign valuation, that branch of Congress "may expect that it will be sent to the Ways and Means Committee, which will send back to the Senate a bill based on American valuation." Mr. Fordney added that he would "never agree to any foreign valuation and I do not know of any Republican member of the House who will or who wants foreign valuation."

This situation plainly opens a breach. Its outcome is purely problematical. It may greatly delay enactment of tariff legislation, which already has been deferred by the Finance Committee to a point where the manufacturing interests of the country have become irritated. There are even those who have no restraint in saying that the Senate Committee is purposely trying to delay tariff legislation further in the hope that the dilemma it has faced over the valuation feature will be worked out through some sort of adjustment of world-wide economic conditions. At the same time, the Republicans, who are responsible for legislation, undoubtedly would have fears of political results if they postponed tariff legislation when their platform has pledged them to tariff revision. It is clear that the Republicans fear the possible political effect if action is deferred much longer. A way out of the situation may not be found unless the President goes definitely on record in favor of some tariff valuation plan. Those in favor of the American valuation plan do not accept the statement that the Senate committee's present attitude can be logically based on any suggestion made by the President. The President, in his annual message to Congress last December in speaking of the American valuation plan, said there could not be ignored "the danger of such valuation making American tariffs prohibitive." Republicans of the House assert that this statement by no means condemns the American valuation plan and does not justify the action of the Finance Committee. On the contrary, they say the reasoning of the President is perfectly sound and simply was a warning against the danger of fixing duties too high. Manifestly a given ad valorem duty is more highly protective under the American valuation plan than it is under the foreign valuation plan. This difference obviously is due to the exchange situation and, according to House Republicans, was taken into consideration when they passed the American valuation plan.

Urged Moderate Duties

Iron and steel manufacturers in substance have expressed the same sentiment as that of the President and have consistently urged only moderate duties based on the American valuation plan. Unless it is finally adopted, they point out that higher duties than those carried in the House bill will be necessary as a measure of protection. This is one of the contentions made in a brief recently filed with the Finance Committee by Chairman John A. Topping of the Republic Iron & Steel Co., on behalf of the independent steel industry in which he asked that the American valuation plan be adopted. His brief was in reply to arguments made

against the American plan and supplemented previous statements he and other steel producers have made before both the Ways and Means and Finance Committees.

The Smoot Amendments

The tentative plan of the Senate Committee is based on amendments prepared by Senator Smoot, which Republicans of that committee maintain are designed to meet disturbed economic conditions of the world with the resulting depreciation of foreign exchange. They take into account proclaimed American valuation, flexible rates that might be moved up a maximum or down a minimum of 50 per cent and depreciated foreign exchange as well as provisions intended to prevent discrimination against American exports. Final action on the Smoot provisions is being withheld until an opinion is received from the State Department as to whether the American valuation plan and the depreciated exchange provisions would be in violation of "most favored nation" clauses of existing commercial treaties. Those favoring the American valuation plan plainly do not take much stock in the claim that it would violate such treaties and have pointed out that countries throughout the world have had no hesitancy in erecting high tariffs such as this country has not contemplated.

They also say that granting that there is any substance to the argument about the violation of the treaties mentioned, the Senate Committee has been slow to raise the point. They also are unable to reconcile the attitude of the Finance Committee with the fact that it had employed a staff of experts under the direction of James B. Reynolds to investigate the practicability of the American valuation plan, and despite the attitude of Mr. Reynolds that it is practicable, has for the present at least suggested the foreign valuation plan. The report of Mr. Reynolds has never been made public, but in a brief statement at the recent convention in Washington of the National Association of Manufacturers, who went on record in favor of the American valuation plan, he made the statement that the plan is workable. Critics of the Senate Finance Committee also have commented on the fact that it at one time had practically determined upon this system and was engaged in transferring many duties from an ad valorem to a specific basis. Then also, it is pointed out, it had been about concluded to base duties on the American wholesale selling price. The present shift consequently has aroused real interest, to say the least, but apparently the Republican members of the Finance Committee think it is the logical step to take and work now is under way of returning many duties, it is said, from a specific to an ad valorem basis. There has been a difference of opinion on the plan of duty assessment among officials of the Treasury Department as well as among members of the Tariff Commission. The final solution determined upon necessarily is being awaited with anxiety and even more concern is being shown over the outcome of the difference between the House Republicans and the Republicans of the Committee on Finance.

Mr. Topping's Brief

In his brief filed recently with the Finance Committee, Mr. Topping said that unless the American valuation plan is adopted rates of duty on iron and steel products will have to be greatly increased. He contended that the American valuation plan is necessary even to rates on iron and steel articles which take specific duties. He explains that the value of iron and steel determines in many cases the classification under which duty is assessed and to prevent undervaluation

or fraudulent methods, American valuation is necessary for protection. Furthermore, he states, there are important iron and steel rates rated on the ad valorem basis which selling methods long in vogue require should be continued and these special products, it is pointed out, are exposed.

The brief of Mr. Topping, in part, says:

It has been stated before the Senate Finance Committee by a representative of the Fair Tariff League, that the method of American valuation proposed, results in tariff discrimination, because cost varies with the country of production, and therefore, the exporting country with the minimum cost, would pay a lower rate of duty than the exporting country with the maximum cost. This may be admitted, but this objection would be also true of foreign valuations, because cost variations are not leveled by any method we might adopt in valuing importations.

American valuation, on the other hand, has the distinct merit of not being discriminatory, as all exporting countries would pay the same amount of duty, and therefore, no discrimination is practiced, whereas discrimination is unavoidable under foreign values, as the amount of duty varies with the cost of the product.

The administrative features of the American plan are practical, and can be easily operated. It has been demonstrated, that it is easier to obtain necessary data at home for appraising commodities, than it is to obtain data of a reliable character, in foreign countries.

In fact, under the present law, which permits of duty being levied upon American values, when no other method for determining values is obtainable, emphasizes the fact that American values are always obtainable, whereas experience shows, this is not true of foreign values.

American valuation will not increase the price to the American consumer, but will prevent under-valuations. Under-valuations principally benefit the exporting country and the importing agent, because the imported product is sold, like domestic products, on the basis of what competition, from time to time, suggests, rather than by what the cost of the product justifies. It is, therefore, more important to prevent under-valuation to conserve Government revenues, and to prevent the uncertainties and inequalities arising from depreciated and fluctuating currency values, than it is to legislate to support a theory with doubtful advantages to the consumer, particularly when there can be no doubt that every dollar of imported product brought into our markets, means less work for our people.

Assessment of duty on foreign valuations, converted into United States money at prevailing low rates of exchange, is now enabling foreign manufacturers to displace American products at the expense of American workmen. Unemployment is destroying the purchasing power of the people, and unless this situation is remedied, it will eventually prostrate all American industries which are exposed to this unfair competition.

BASING POINT HEARING

Sessions at Milwaukee Ended—Investigation to Be Continued This Week at Washington

MILWAUKEE, WIS., Feb. 20.—The first hearing of the series ordered held by the Federal Trade Commission upon its complaint against the United States Steel Corporation, seeking the abolition of the Pittsburgh basing point practice because of the alleged discriminatory effect upon Western rolled steel consumers, was brought to an end on Saturday, at the close of the third week of trial sessions opened Jan. 30 in the Government building at Milwaukee by Examiner John W. Bennett.

It was announced that the commission will open the second of the series of hearings on March 1 at Minneapolis.

In the meantime, however, the commission will conduct a hearing at its headquarters in Washington upon the results of the investigation in Milwaukee. Questions concerning the admissibility of evidence will be definitely decided and decisions made upon a large number of motions and objections made by counsel for the commission as well as the Steel Corporation during the hearing at Milwaukee, which during the introduction of testimony were merely noted by the trial examiner for future determination. The decisions upon these questions are expected to have an important effect upon the large mass of evidence recorded thus far, and upon the conduct of future hearings.

Points in Controversy

W. W. Corlett, general solicitor of the Steel Corporation, entered motions at the final session of the hearing in Milwaukee on Saturday, indicating that the points of evidence in controversy will be taken up under four separate headings at the hearing before the entire commission in Washington this week. These are as follows:

1. The introduction of contracts, invoices and correspondence with manufacturers of rolled steel material other than those between the respondent, namely, the U. S. Steel Corporation, and its subsidiary corporations, and concerns whose officials and representatives have testified.

2. The limitation upon cross-examination of inquiry

into the (a) profits made upon any article manufactured, and the (b) profits as a whole made by any concern, its increase in net assets, the amounts of dividends paid, and any other facts tending to show the state of prosperity of the concern.

3. The introduction of testimony intended to show a higher cost to the ultimate consumer, or in other words, "the public interest."

4. The mere expression of an opinion by a witness as to the ability of the company which he represents to compete in a given territory, heretofore admitted as expert testimony.

Last Week's Evidence

Witnesses who testified during the final week of the hearing in Milwaukee reiterated to a large extent the evidence presented by previous witnesses. A new angle was introduced by the testimony of L. E. Geer, secretary and treasurer, and Herman A. Meyer, purchasing agent, Manitowoc Ship Building Corporation, Manitowoc, Wis. This testimony in effect was that the company in the last five years purchased approximately 42,000 tons of plates and other rolled material, of which amount about 90 per cent was purchased from the Illinois Steel Co. and shipped from mills in the Chicago or Gary districts, with the freight rate from Pittsburgh to Manitowoc invariably included in the invoice price, although billed f.o.b. Manitowoc. Both witnesses testified that the Manitowoc company lost a considerable quantity of business in competition with shipyards along Lake Erie because of the more advantageous geographical location of the Lake Erie yards in relation to the cost of material purchased upon a Pittsburgh basing point. The witnesses testified that they estimated the amount of money represented by unearned freight charges paid on steel in the past five years at \$140,000.

E. E. Russell, vice-president J. I. Case Threshing Machine Co., Racine, Wis., in his testimony, revealed that his company fixes its selling prices by finding the cost of production and then adding a 10 per cent margin of profit. Thus, Mr. Russell testified, every purchaser of a Case product, wherever located, paid not only 10 per cent upon cost, but a similar percentage upon unearned freight charges when steel material was derived from mills near Racine and freight from Pittsburgh to Racine was added to the purchase price. Upon cross-examination, Mr. Russell admitted that the International Harvester Co. was able to sell threshers at a lower cost than the Case company, but that this difference did not materially affect the competition, which is

governed to a considerable extent by prestige and other considerations not related to cost and selling prices.

Fabrication in Transit Plan

Herman A. Wagner, president Wisconsin Bridge & Iron Co., Milwaukee, testified his company consumes about 16,000 tons of structural shapes annually on the average, and by reason of the imposition of unearned freight charges from Pittsburgh, it was impossible to compete on an equal basis with fabricators east of Chicago. Western competition is possible, he said, only under the fabrication-in-transit privilege, which imposes a penalty of 2c. per 100 lb. It has been the intention of the Wisconsin company to increase its capacity and enter Eastern fields of competition if it were not handicapped by the Pittsburgh basing point practice, Mr. Wagner said, but under existing conditions it is not possible to employ the capacity of the present plant to the utmost because the field is restricted.

W. T. Bastian, purchasing agent Harvey Spring & Forging Co., Racine, Wis., testified that his concern purchased about 10,000 tons of steel annually, and 84 per cent is shipped from mills of the Illinois Steel Co. in the Chicago district, but freight from Pittsburgh to Racine invariably was added, save in the last six or

eight months, when purchases have been made on a Chicago basing point. E. J. Harvey, president of the company, testified that the steel represented 68 per cent of the cost of the finished article, and that 30 to 40 per cent of the material was wasted in the process, which increased the handicap he said his company was under in competing with competitors located nearer Pittsburgh, for business in such automotive centers as Cleveland, Detroit and Flint.

Irving Smith, president Sterling Wheelbarrow Co., Milwaukee, testified that he purchases 2000 tons of steel annually and that 30 per cent of this amount is derived from Chicago district mills, but freight from Pittsburgh is charged on such purchases as well as on those delivered by mills farther east.

W. E. McCollum, secretary Western Association of Rolled Steel Consumers, which is supporting the complaint of the Federal Trade Commission, stated that according to the best information available, Milwaukee fabricators of rolled steel consume between 150,000 and 200,000 tons annually. The freight rate from Pittsburgh to Milwaukee is 41½c. per 100 lb. He figures that unearned freight charges collected on material delivered from Chicago district mills amount to more than \$1,000,000 annually under the Pittsburgh basing point practice.

Steel Plates Containing Zirconium and Other Elements

An investigation of the manufacture and properties of steel plates containing zirconium and other elements has been conducted by the Bureau of Standards and has been published as Technological Paper No. 207. The investigation originated from the need of the ordnance department of the army and navy for information regarding the effects on the ballistic properties of light armor plate of certain chemical elements such as zirconium.

A joint program was outlined according to which the Bureau of Mines was to produce and analyze ingots of the desired compositions; the Bureau of Standards to manufacture and heat treat the plates, carry out physical tests, micro-examinations and chemical analyses, and develop methods of chemical analysis, when needed, for the more unusual elements in steel and in the presence of each other; and the Navy Department was to carry out the ballistic tests.

Although the results of the ballistic tests are not available for publication, an account of the mechanical properties and tests of this series of somewhat unusual steels was considered worthy of publication. These results may be summarized as follows:

About 193 heats of steel containing in various combinations the following principal variable elements—carbon, silicon, nickel, aluminum, titanium, zirconium, cerium, boron, copper, cobalt, uranium, molybdenum, chromium and tungsten, have been studied.

None of the steels presented any difficulties in rolling into plate except those containing boron.

The usual mechanical properties and impact tests were carried out on all of the steels. It is shown that steel containing 0.40 to 0.50 per cent carbon, 1.00 to 1.50 per cent silicon, 3.00 to 3.25 per cent nickel, and 0.60 to 0.80 manganese and deoxidized with a simple deoxidizer such as aluminum can be produced having a tensile strength of approximately 300,000 lb. per sq. in. with excellent ductility and toughness. This type of steel is recommended for a structural material.

Although the same high properties are obtained in steels of the above composition with the aid of additional elements, it does not appear necessary to resort to such additions of expensive alloying elements.

Zirconium, like titanium and aluminum, acts primarily as a scavenger, and when it is not removed as part of the slag remains in the steel in the form of square bright yellow inclusions not directly visible at magnifications lower than 500 diameters. It is not considered that these inclusions can be very beneficial and if they are segregated and rolled out into thin plate-like streaks they may be detrimental, especially in armor plate.

Of the other elements that are regarded as special alloying additions, chromium, tungsten, vanadium and molybdenum go into solution and produce a martensitic pattern in the air-cooled specimens. Cerium and uranium act in a similar manner but also show character-

istic inclusions. Copper goes into solution but a larger amount is required to produce a martensitic-pattern in the air-cooled samples than for the others. Boron forms a complex eutectic, probably that of an iron-carbon-boron compound with iron. This eutectic is fusible at the temperatures ordinarily used in rolling, but at slightly lower temperatures steel containing boron can be rolled successfully. Hot working breaks up the eutectic and spherical hard particles, similar to iron carbide globules, are formed.

Contract for Reconditioning the Leviathan

WASHINGTON, Feb. 21.—The contract for reconditioning the liner Leviathan, was formerly awarded by the Shipping Board last Wednesday, to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The vessel is to be ready for service early in 1923. The work of putting the ship in condition for service will begin at once both at Hoboken, N. J., where the Leviathan now is, and at the yards of the Newport News company, which corporation will convert the steamer into an oil burner for the sum of \$6,110,000. The contract for steward's equipment and interior furnishings was awarded to Gimbel Bros., New York, at \$551,000. The total cost to the Shipping Board will be \$8,200,000. The hull of the vessel will be painted at the Boston Navy Yard at a cost of \$191,000.

Unavailing efforts were made by representatives and senators from Massachusetts to have the vessel reconditioned at the Boston Navy Yard, and qualifying legislation to this end was enacted.

Ford Co. New Brass Foundry to Use Electric Melting Equipment

The Detroit Electric Furnace Co., Detroit, has recently received an order from the Ford Motor Co. for five 2000-lb. 300 kva. Detroit rocking electric furnaces to be installed in the company's new brass foundry in the Highland Park plant. These furnaces are to be equipped with automatic electrode control and, together with the first Detroit unit already installed, will afford a melting capacity of approximately 150,000 lb. of metal per 16-hr. day. The battery of furnaces will be installed and in operation about April 1.

The Erie Foundry Co., Erie, Pa., recently completed an order for 67 steam drop hammers ranging in size from 800-lb. to 5000-lb. for the Ford Motor Co., for installation at its Highland Park plant. There are now approximately 100 Erie hammers in the Ford Motor Co. works.

LEATHER BELTING RESEARCH*

Manufacturers Have Conducted Investigation Into Various Phases of Its Use

The experienced belt-maker would probably say that the two most frequent sources of trouble are belts stretching and running crooked, the latter usually with very high speed drives where single belts are most likely to be used. It is evident that there are a number of things which may affect the stretch of a belt, such as the kind of hide used, tannage, method of currying—that is, the percentage and distribution of grease in the leather itself, and the thoroughness of stretching given to the leather before it is made into a belt. The hide of spongy fiber or consistency is likely to make leather that is more "stretchy." It is well-known that certain tannages, probably those which do not well fill the inter-fibular spaces, make leather which is more likely to stretch than that which is dead tanned.

Belts running crooked, when not due to abuse, are certainly sometimes caused by the springing of the piece of leather, after it is stripped to width, which is probably related somewhat to the factors influencing stretch just previously noted. With leather which is not very thoroughly tanned there seems to be a tendency for one edge of the strip to draw up more than the other after it has been stretched, and thereby pulling crooked. Aside from the annoyance to the user by having frequently to tighten the belt, the tendency to stretch causes a rapid reduction in the tension, and unless the coefficient of friction is unusually good, there results a rapid diminution in the effective tension and the work which the belt will do. While a moderate amount of stretch is perhaps not a serious matter, the importance of this being removed as soon as possible, so that an effective tension high enough to carry the load satisfactorily may be maintained is of great importance.

Increased Belt Tensions Not Unlikely

As far back as the days of Frederick Taylor considerable work was done in determining what was the proper tension to give a belt. He arrived at figures which were certainly conservative and practicable. I think there is not much doubt that if the belt users of the country had been willing to adopt his recommendations in this respect, they would have had greater economy with belting than has been the case. However, the tendency has been to load closer to the limit and to settle upon a tension which could be maintained fairly steadily, but which would give a maximum of power transmission. It would not be surprising to see higher tensions still adopted with improved methods of manufacture and better types of bearings.

Closely allied with the question of stretch is that of creep and its cause, and elasticity, which we have for a long time thought one of the most valuable properties of the leather belt, and one which differentiated it sharply from most of the substitutes available. Some of the work on this has been done by Mr. Jones and Professor Sawdon, which has thrown rather more light on earlier work and theories in connection with the subject.

Questions of Creep and Elasticity Studied

They have shown that the leather belt is not perfectly elastic in that it comes back immediately after the removal of tension, but that there is a time lag which may have some bearing upon the problem of transmission of power. Just what this is will probably vary a little with different leathers, but from the practical standpoint of power transmission it seems pretty clear that it will account for perhaps the first three quarters of one per cent or one per cent of what we read as slip in our power transmission curves, and it would seem reasonable that there is room for further improvement in reducing this a little more in a way

which will increase slightly the efficiency of the leather belt.

The wide variation in the observed coefficient of friction readings on a belt when it is just new and that obtained after it has been in use some time shows clearly the importance of a proper finish on the surface. One interesting feature which had not been carefully studied until perhaps of recent times is in the observation that the coefficient of friction changes quite noticeably at different speeds of slip on a given piece of leather, though the coefficient of friction does not apparently change in any considerable way at different tensions. It is obvious that in a running belt the effective tension, which is the difference between the tension on the tight side and the slack side, is limited very definitely by the coefficient of friction obtained at a given speed of operation and of slip. This problem seems to be one of the very fertile fields for further work.

So far I have not mentioned the often spoken of factor of tensile strength, though it is apt to be one of the main things alluded to in leather belting specifications. I have not mentioned it because the factor of safety in a good leather belt is high, often 5 to 1 to 10 to 1, and it is a very rare thing to hear of a belt tearing because of the load applied to it, unless some accident has occurred.

Belt Speeds

Another very important factor in the capacity of a given belt to transmit power is speed, and while considerable work has been done on this subject, there is still a good deal to learn. It has only been a few years since a prominent leather belting manufacturer stated that he considered it good practice to run leather belts for woodworking machinery at speeds in the neighborhood of 9000 ft. per min. Other makers disagree with him. Dr. E. D. Wilson, in presenting data on the subject published in 1919 (and on which the tables published by the Exchange are based) has shown that at this speed a double belt will transmit practically no power and a single very little indeed.

There is no available machinery for actually making such tests at these high speeds, and general experience in which little scientific data is available seem to indicate that the greatest efficiency is obtained at speeds of 4000 to 5000 ft. per min. So far as I am aware, none of the data submitted take into consideration the effect of grease, and of the varying coefficient of friction at the high speed of slip which would be obtained at any such speed as 9000 ft. per min. We do know, of course, that the centrifugal force increases very fast on higher speeds, tending to throw the belts away from the pulleys, and it is likely that in scientific work on this subject when it is done thoroughly will, as is so often the case, bear out practical shop experience, at least in large measure, and recommend the limitation of speed to a more reasonable figure.

Some years ago the subject of humidity and its effect upon leather belts was investigated, but whether or not due consideration was given to the variation in the modern methods of currying from the old hand stuffing, and whether the tests were made on a large number of belts, or only on a few of one make, I am not aware. It does seem, however, pretty clear that the presence of large amounts of humidity lowers the effectiveness of a leather belt, but it is also likely that proper treatment will do something to lessen this tendency.

Use of Belt Tightening Pulleys

During the past few years the use of compressors and machines with a wide variation in loads has rather increased, and motor driven compressors with a binder pulley or tightener have become very much more common. This type of drive has received comparatively little careful investigation, though it has known to work quite well with proper installation and sufficient belt capacity. It does, however, seem quite clear that it is necessary to have more belt for a load of this kind based upon the power required from the motor than for an ordinary steady pull; some say twice

*From a paper read by J. Edgar Rhoads before the National Association of Leather Belting Manufacturers.

as much is needed, but I believe this is still another subject requiring careful test under well controlled conditions.

Closely allied with this is the question of arc of contact, the effect of increasing or decreasing this in the load which a belt will carry, and also the most effective way to arrange drives where there is a small driver and a large driven or vice versa.

The subject of center distance was investigated somewhat during this past year at Purdue University, but time prevented final or the most thorough kind of test. The mill-wright has known for a long time that increasing the center distance was a great help, and that with a well designed drive, the position of the catenary formed by the slack side on top was a great help in steadying the belt, particularly on sloping

drives where belts were running at angles with the floor.

During the past few weeks a very careful comparison has been made to settle the much mooted question as to which side of a single belt should run next to the pulley, and Mr. Jones has prepared very complete figures which he has probably just about ready to publish, which represents an enormous amount of careful work and prove conclusively that the grain side of the leather belt is on the average decidedly superior to the flesh, though he has found that some belts, carrying very high amounts of grease, will do nearly as well when run with the flesh side to the pulley as the grain. These, however, are not representative of the great mass of standard leather belts upon the market.

POWDERED COAL INSTALLATIONS

Considerations of Capacity of Equipment and of Power Requirements for Pulverizing Coal

In a 131-page pamphlet, entitled "The Preparation, Transportation and Combustion of Powdered Coal," prepared by John Blizard, the Canadian Department of

for bituminous coal containing not more than 10 per cent of moisture. When greater moisture is contained, in some cases larger sizes would be required, or the moisture removal would be less than standard.

Table III. shows the amount of heat required, and the amount of undried coal which has to be burned, in order to dry coal containing from 4 to 14 per cent of moisture. The figures are worked out on a basis

Table I—Standard Sizes and Capacities of Aero Pulverizers

	Size and Weight (Lb.)	Normal Load Soft Coal (Lb. per Hr.)	Floor Space (Inches)	Height (Inches)	R.p.m.	Horsepower—Normal Consump- tion	Motor Recommended	Space Occupied (Cu. Ft.)	Per Net Ton of Load—Weight (Lb.)	Hp. Consumption	Space (Cu. Ft.)
A.....	2,250	600	27 1/2 x 61 1/2	28 1/2	2,050	10	15	28.5	7,500	33.3	95.0
B.....	4,000	1,000	29 x 77 1/2	45	1,750	14	25	58.5	8,000	28.0	117.0
D.....	5,400	2,000	29 x 85 1/2	46 1/2	1,550	30	40	67.3	5,400	30.0	67.3
E.....	5,900	3,000	33 x 89	50	1,450	40	50	85.0	3,933	26.7	56.6
G.....	12,000	5,000	40 x 116	59	1,450	65	90	158.4	4,800	26.0	53.4

Mines has put forth a compendium of information on the subject, based partly upon direct investigation in the shape of field studies, and partly upon a compilation from printed data otherwise available. So much of the information in this volume is of permanent value that a portion of it, in the shape of tables, is

Table II—Fuller-Lehigh Dryers for Bituminous Coal with Not Over 10 Per Cent Moisture

Tons Coal per Hour	Size of Dryer—Diam Ft	Length Ft	Volume Cu Ft	Volume per Ton Cu Ft	Horsepower to Rotate Shell	Horsepower per Ton Hourly Capacity
4	3	30	212	53	3	0.75
6	3 1/2	30	289	48	4	0.67
8	4 1/2	30	477	60	5	0.625
10	4 1/2	42	668	67	6	0.6
14	5 1/2	42	998	71	7	0.5
20	6	42	1,188	59	8	0.4
25	6 1/2	42	1,394	56	10	0.4

republished here. This has been somewhat rearranged from the tables as given and has been amplified in certain particulars.

Table I. shows standard sizes and capacities of Aero pulverizers, with normal loads ranging from 600 to 5000 lb. per hour of soft coal. This shows not only the size and weight of the pulverizer for the

Table III—Heat Required, and Undried Coal Burned, to Dry Coal Containing 4 to 14 Per Cent of Moisture, to 100 Lb. of Coal with 2 Per Cent of Moisture

Moisture in raw coal, per cent	4	6	8	10	12	14
Moisture evaporated, lb.	2.1	4.3	6.5	8.9	11.4	13.9
B.t.u. to evaporate this moisture	2,300	4,700	7,200	9,900	12,600	15,500
B.t.u. given to 100 lb. of coal	4,100	4,100	4,100	4,100	4,100	4,100
Total heat used	6,400	8,800	11,300	14,000	16,700	19,600
Lb. coal burned at						
70% efficiency	0.65	0.95	1.25	1.58	1.93	2.32
80% efficiency	0.79	1.11	1.46	1.84	2.26	2.71
90% efficiency	0.95	1.34	1.76	2.21	2.71	3.25

various capacities, but also the power consumption and the size of motor recommended

Table II. shows the sizes of Fuller-Lehigh dryers and the power requirements for hourly capacities ranging from 4 to 25 tons of coal. These figures are given

of obtaining, as a final product, 100 lb. of coal with 2 per cent of moisture, and the coal consumption for drying is figured on a basis of 70 per cent, 60 per cent and 50 per cent efficiency in the combustion of the coal used for this purpose.

Table IV. shows the power required for pulverizing coal to certain degrees of fineness. In the first part of this table, which relates to Raymond pulverizers, capacities are covered from 1 to 25 tons of coal per

Table IV—Power Required for Pulverizing Coal A—In Raymond Pulverizers

Grinding Room Capacity, Tons per Hr	Percentage Through		Horsepower Required	
	100 Mesh	200 Mesh	Total	Per Ton
1	99	95	45	45.0
2	95	82	45	22.5
3	99	95	60	30.0
4	95	82	60	20.0
5	99	95	85	28.3
6	95	82	75	18.8
7	99	95	85	17.0
8	95	82	170	28.7
10	99	95	170	17.0
15	99	95	255	25.5
20	95	82	425	17.0
25	99	95	680	27.2

B—In Fuller-Lehigh Pulverizers (95 per cent through 100 mesh)

Size of Mill	Output per Hour	Horsepower	Horsepower per Ton Output
24-in.	1000 to 1200 lb.	10	18.0
33-in.	2 to 2 1/2 tons	30 to 35	14.5
42-in.	4 to 6 tons	45 to 60	9.5
57-in.	8 to 10 tons	100	11.0

hour. In the second part of the table, which relates to Fuller-Lehigh pulverizers, capacities range from 1/2 ton to 10 tons per hour.

The Minnesota Steel Co., Duluth, Minn., has work in active progress on its new wire manufacturing plant on local site, and plans to commence the installation of machinery in about 60 days, having the entire plant ready for operation early in June.

The Alliance Structural Co., Alliance, Ohio, has increased its capital stock from \$200,000 to \$500,000.

BIDS OPENED ON TUNNEL JOB

Booth & Flinn, Ltd., Quotes Lowest Price \$19,331,723.50, and Will Get Contract

Booth & Flinn, Ltd., 17 Battery Place, New York, was low bidder on the contract for construction work on the Hudson River vehicular tunnel, bids on which were opened at the Hall of Records, New York, Feb. 15, its price on contracts Nos. 3 and 4 being \$19,331,723.50. Among the itemized bids a price of \$57.50 per ton was submitted on the 33,200 tons of cast iron segments in contract No. 3 and \$47.50 per ton on the 72,300 tons of cast iron segments in contract No. 4, totaling \$1,782,840 and \$3,434,250, respectively.

Booth & Flinn, Ltd., has handled numerous tunnel and subway construction contracts, among the most recent being the tunnel extending from Clark Street, Brooklyn, to Old Slip, New York, built for the Interborough Rapid Transit Co. and the Montague Street tunnel in Brooklyn, constructed for the Brooklyn Rapid Transit Co.; a tunnel from Fourteenth Street, New

York, to North Seventh Street, Brooklyn; tunnel construction in Newark, N. J., for the Passaic Valley Sewage Commission; Liberty tunnel through rock, for Pittsburgh, and several contracts on clay tunneling for sewers in Detroit. Award of the sub-contracts for materials involved will probably be made by Booth & Flinn within the next week or 10 days.

Quotations on some of the iron and steel items in the Booth & Flinn bid were as follows: On the 2000 ft. of wrought iron or steel pipe, 1-in. to 4-in., quotations ranged from 40c. to \$1.70 per ft. and totaled \$2,130; on 34,400 ft. of galvanized iron electric conduit the prices were from 15c. to 75c. per ft. and totaled \$10,468.50; on the cast-steel tunnel lining totaling 9,050 tons, \$85 per ton was the price submitted in contract No. 4, and \$90 per ton on contract No. 3, totaling \$769,750; on cast-steel pile segments the total was 370 tons and the prices \$85 and \$90 per ton; on 15,590 ft. of cast-iron service pipe, ranging from 6-in. to 12-in., \$1.40 to \$3.50 per ft. was quoted; on bolts and nuts the total was 4,615 tons at \$150 per ton, totaling on both contracts \$692,250.

JAPANESE MERCHANTS BUYING

**Purchases No Longer Confined to Government—
German Competition Slackens—Low
Rail Prices**

NEW YORK, Feb. 20.—Practically all export inquiries of any importance are still appearing from Japanese sources with some slight activity on the part of China. Buying from Japan, which has heretofore been largely governmental, is beginning to include merchant buying. Last week one Japanese export house booked orders for about 1800 tons of merchant steel for Japan. This included 450 tons of merchant bars; 250 tons of structural steel; a tonnage of black and blue annealed sheets, and a fairly large order for 15-in. beams. Japanese buyers are beginning to evince a strong interest in steel bars and there have been several small orders booked by New York exporters. Sizes on these orders generally range from $\frac{3}{4}$ -in. to as large as $\frac{3}{4}$ and 1-in. One bar order for 600 tons is reported and another for 200 tons. Wire rods also continue active, one exporter having booked during the past two weeks about 2000 tons in small orders. A New York exporter is quoting on an inquiry for 200 tons of 42 to 80-lb. I beams of 15, 20, 22 and 24-in. and has sold about 5000 kegs of checker head, countersunk wire nails.

German competition in Far Eastern markets seems to be largely confined to material upon which labor is a large item. German bars, however, have quite recently been sold to Japanese buyers on a basis which figures back to 1.09c. per lb., Pittsburgh. British sellers are now quoting \$53 per ton on wire rods, c.i.f. Japanese port. If this is the lowest possible price by United Kingdom sellers, exporters in the United States are contemplating selling wire rods into England, provided they can buy low enough to deliver at about \$45 per ton, c.i.f. United Kingdom port.

The recent rail purchases by the Imperial Government Railways and the South Manchuria Railway Co. are said to have brought out low quotations. The Imperial Government Railway specification, which called for 10,000 tons of 60-lb. rails, is said to have been placed with a Japanese export house at \$43.96 per ton, c.i.f. Japan, while the South Manchurian rail contract involving about 6800 tons of 100-lb. rails is said to have gone at \$46.25 per ton, c.i.f. Dairen, Manchuria. On this latter the best bid possible by German mills was \$47, but German bids through the United States were not permitted. Inquiries for rails by Far Eastern interests will undoubtedly bring out good prices. One New York exporter states that he was quoted \$36.23 per ton, f.a.s., New York, on a tonnage of 35-lb. rails for the Far East and was given a still lower quotation by another mill.

Chinese activity is at present confined to purchases of small lots of black sheets, nails, second-hand struc-

tural steel and bar crop ends. The Japanese government inquiry for bridge material, which was to have closed the latter part of January, has been placed with one of the large Japanese export houses, which quoted on the price of a leading independent. It totals 4000 tons. Another tender on bridge material is still pending. Kobe municipality is in the market for another tonnage of T rails for its trolley line, bids on which will be opened the latter part of this month.

Steel Manufacturers Elect New Officers

At the annual meeting of the Association of American Steel Manufacturers, held at the William Penn Hotel, Pittsburgh, Feb. 17, Jesse J. Shuman, inspecting engineer Jones & Laughlin Steel Co., was elected president; E. F. Kennery, metallurgical engineer, Midvale Steel & Ordnance Co., vice-president, and J. O. Leech, manager bureau of inspection and tests, Carnegie Steel Co., secretary-treasurer. Robert H. Irons, Central Iron & Steel Co., retiring president, was presented with a silver after-dinner coffee service.

Shipping Board Will Sell Steel at Auction

WASHINGTON, Feb. 18.—After rejecting sealed bids which were opened last Wednesday, the Shipping Board has turned to the plan of disposing of the 105,000 tons of surplus steel at Hog Island by public auction and named to-day to sell the material in this manner. The board did not reveal either the number of bids received or prices offered nor its reason for rejecting them last week. It is said, however, that there were seven or eight bids received and that they were rejected because of the low figures named.

Hammond Iron Works, Warren, Pa., recently shipped on the Ward line steamer, Canto, from Baltimore, 95 carloads of fabricated plates, part of a contract for 13 82,000-barrel tanks for the Gulf Refining Co., Port Arthur, Texas. The tanks are 140-ft. in diameter and 30-ft. high.

The New England Iron League will hold its annual winter outing at Jackson, N. H. Members will leave Boston, Saturday afternoon, Feb. 18, and will return on the evening of Feb. 22. C. N. Fitts, New England Structural Co., Everett, Mass., has charge of arrangements.

The Anchor Concrete Machinery Co., Rock Rapids, Iowa, has moved to Adrian, Mich. The plant and site of the Adrian Steel Castings Co. have been purchased and machines for producing blocks, brick and cement will be made as soon as equipment can be installed.

Iron and Steel Markets

INCREASED ACTIVITY

February Exceeding January Production

Advances in Pig Iron But Weakness Still in Steel—Broad Demand Maintained

Increased pig iron and steel making is the outstanding factor of the week. It is the response to necessity buying and the railroad purchases of cars and track material of the past month.

The Steel Corporation is operating at better than 50 per cent, but business accumulated by the independents has shortened the gap between their scale of operations and that of the corporation. The Illinois Steel Co. is making 55 per cent of its capacity in ingots and the Inland Steel Co. is on a 60 per cent basis. Little of the railroad business went to the East, but the average of independent makers is over 40 per cent and the February production rate promises to exceed measurably the January output, which in steel was 46½ per cent of capacity.

An unexpected development was a well-defined effort to stabilize pig iron prices. Against doubts that advances can be held is the actual blowing in of at least five more blast furnaces, with two others scheduled to go on the active list before the end of the week.

It remains that rolling mills are yet unable to bring up order books to a point necessitating deferred shipments, and buyers, sure of deliveries, continue to cover merely for needs. Present activity represents orders taken at a sacrifice to establish backlogs and price weakness has not yet disappeared. A firmer attitude on new inquiries is, however, more general.

Railroad car business is still encouraging. The Great Northern, which closed on 500 cars, is still to buy 750; the St. Paul is expected shortly to cover for 2000 and the Pacific Fruit Express Co. for 3300. Five or six round lots of rail orders have been booked and the Gary mill has had releases on 20,000 tons on existing contracts.

The demand for bridge and building construction is indicated by fresh projects involving 22,000 tons and the awards aggregating 14,000 tons. January's business in fabricated structural steel, 72,100 tons, was at a rate of 40 per cent of the country's capacity and is barely 13 per cent under the January average for 10 years.

A few sales of various grades of pig iron have been made in the Chicago district on a basis of \$20, an advance of \$2 over recent quotations, but doubt is expressed that this advance can be maintained. The effect has been to cause firmer prices on irons which have been competing with the Chicago product. This is particularly noticeable in Cleveland, but concessions of 50c. have been made on iron from the Cleveland district when made in territory distant from Chicago. At Philadelphia there is more activity, but furnaces are absorbing freight when necessary.

Cast iron pipe awards, some of it seasonal, total 17,000 tons in a number of large size orders.

Three freight boats are now under negotiation for construction at Lake yards, each taking 4000 tons of steel.

The broadening market has brought increasing business from the automobile and the agricultural implement trade. The American Sheet & Tin Plate Co. has opened its books for the second quarter at to-day's prices.

In wire products there is no lack of inquiry from jobbers in preparation for spring demand. Manufacturers find it difficult to get concessions on small lots and hesitate to buy in a large way when meeting a refusal for a guarantee against price declines. Wire rods have been sold at \$35 a ton, with \$36 the usual quotation.

On shafting 2c. is still an asking price, but 1.90c. is the more common maximum, and even this is shaded.

Shading of \$3 and \$4 a ton is occasional on hot-rolled strips.

Rivets are lower, reductions in some centers amounting to \$3 a ton. Structural rivets are now obtainable at \$2.10 and boiler rivets at \$2.20. For a large pipe line in the East, structural rivets were bought at close to \$2.

A large order of tie plates was booked at less than \$30 per ton at mill. Light rails are \$1 and \$2 a ton lower, and now a minimum at 1.40c. a pound.

Better export trade is indicated by participation of private buyers as distinguished from the recent large part taken by Government agencies. For bridge work in Japan 4000 tons of structural material has been placed. American prices in the Far East have so well cut under those of Europe that added promise is given to the possibility of shipping steel to European markets.

Pittsburgh

PITTSBURGH, Feb. 21.

Aside from a well-defined effort to stabilize pig iron prices, general iron and steel market conditions have undergone very little change in a week. Most producers of foundry iron now regard the market as \$19, furnace, for the base grade, and similarly, \$18, furnace, has been set up as a minimum on basic. Some fair-sized tonnages of foundry iron have been placed in the past week at \$19, but there also was a good-sized transaction at \$18.75, this from a Valley furnace. A sale of 1000 tons of basic is noted to a Pittsburgh district sheet maker, but not very definite information as to the price is obtainable. There are reports that the business was placed at \$18, and also that the price paid was the same as on the last previous purchase by the same interest, which was \$17.75. It is clear that none of the producers went below \$18 on this inquiry, but all disclaim having taken the order, and the assumption is that it was placed at less than that figure.

General demand for steel still is for actual rather than future requirements and there has not been much change one way or another in the number of orders placed.

The possibility of a strike of union coal miners on April 1 has come only slightly into the foreground as a factor, but it is seen in the efforts of manufacturers to stock material against such an exigency rather than in any advance buying by either jobbers or con-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron,

	Feb. 21, 1922	Feb. 14, 1922	Jan. 24, 1922	Feb. 22, 1921
Per Gross Ton:				
No. 2X, Philadelphia...	\$21.34	\$21.34	\$21.34	\$30.09
No. 2, Valley furnace...	18.75	18.75	19.00	27.00
No. 2, Southern, Cin'tit...	20.00	20.00	20.50	32.00
No. 2, Birmingham, Ala't...	15.50	15.50	16.00	27.00
No. 2 foundry, Chicago*	20.00	18.00	19.00	28.00
Basic, del'd, eastern Pa...	19.84	19.84	20.25	28.40
Basic, Valley furnace...	17.75	17.75	18.00	25.00
Bessemer, Pittsburgh...	21.46	21.46	21.46	28.96
Malleable, Chicago*	20.00	18.00	19.00	28.50
Malleable, Valley...	19.00	19.00	19.50	27.00
Gray forge, Pittsburgh...	20.71	20.71	20.96	27.96
L. S. charcoal, Chicago...	30.50	30.50	30.50	38.50
Ferromanganese, del'd...	62.50	62.50	60.00	90.00

Rails, Billets, etc.,

Per Gross Ton:				
O.-h. rails, heavy, at mill...	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh...	28.00	28.00	28.00	38.50
O.-h. billets, Pittsburgh...	28.00	28.00	28.00	38.50
O.-h. sheet bars, P'gh...	29.00	29.00	29.00	42.00
Forging billets, base, P'gh...	32.00	32.00	32.00	43.50
O.-h. billets, Philadelphia...	33.74	33.74	33.74	49.24
Wire rods, Pittsburgh...	35.00	36.00	36.00	52.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	1.50	1.50	1.50	2.45
Light rails at mill...	1.70	1.50	1.50	2.75

Finished Iron and Steel,

Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.76	1.76	1.81	2.70
Iron bars, Chicago...	1.55	1.60	1.60	2.63
Steel bars, Pittsburgh...	1.40	1.40	1.50	2.00
Steel bars, Chicago...	1.50	1.55	1.60	2.38
Steel bars, New York...	1.78	1.78	1.83	2.38
Tank plates, Pittsburgh...	1.40	1.40	1.50	2.15
Tank plates, Chicago...	1.60	1.55	1.60	2.53
Tank plates, New York...	1.78	1.78	1.83	2.53
Beams, Pittsburgh...	1.40	1.40	1.50	2.15
Beams, Chicago...	1.50	1.55	1.60	2.53
Beams, New York...	1.78	1.78	1.83	2.53
Steel hoops, Pittsburgh...	1.90	1.90	1.90	2.80

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Sibson, 1.75 to 2.25. †Sibson, 2.25 to 2.75

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,

	Feb. 21, 1922	Feb. 14, 1922	Jan. 24, 1922	Feb. 22, 1921
Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.10
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.35
Sheets, blue ant'd 9 & 10	2.25	2.25	2.25	3.20
Wire nails, Pittsburgh	2.40	2.40	2.50	3.10
Plain wire, Pittsburgh...	2.15	2.15	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.05	3.15	3.85
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$7.00

Old Material,

Per Gross Ton:				
Carwheels, Chicago...	\$15.00	\$15.00	\$15.00	\$19.00
Carwheels, Philadelphia...	16.50	16.50	16.50	22.00
Heavy steel scrap, P'gh...	14.00	13.50	14.00	16.00
Heavy steel scrap, Phila...	12.00	12.00	11.50	14.50
Heavy steel scrap, Ch'go...	11.50	11.25	11.50	14.50
No. 1 cast, Pittsburgh...	16.00	16.00	16.50	22.00
No. 1 cast, Philadelphia...	16.50	16.50	16.50	23.00
No. 1 cast, Ch'go (incl. ton)	13.50	13.00	13.00	17.50
No. 1 RR wrot Phila...	14.50	14.50	14.50	19.00
No. 1 RR wrot Ch'go (incl. ton)	10.50	10.50	10.50	13.00

Coke, Connellsville,

Per Net Ton at Oven				
Furnace coke, prompt	\$3.25	\$2.90	\$2.75	\$4.50
Foundry coke, prompt	4.00	4.00	3.75	5.50

Metals,

Per Lb. to Large Buyers	Cents	Cents	Cents	Cents
Lake copper, New York...	13.00	13.25	12.75	13.25
Electrolytic copper, refinery	12.75	13.00	13.50	12.75
Zinc, St. Louis...	4.50	4.50	4.65	4.95
Zinc, New York...	4.85	4.85	5.00	5.35
Lead, St. Louis...	4.10	4.10	4.40	4.20
Lead, New York...	4.70	4.70	4.70	4.40
Tin (Strait), New York	29.62½	30.75	31.25	32.50
Antimony (Asiatic), N. Y.	4.40	4.40	1.45	5.20

Composite Price, Feb. 21, 1922, Finished Steel, 2.005c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets				
		Feb. 14, 1922	2.005c.	
		Jan. 24, 1922	2.062c.	
		Feb. 22, 1921	2.821c.	
		10-year pre-war average	1.689c.	
These products constitute 88 per cent of the United States output of finished steel				

Composite Price, Feb. 21, 1922, Pig Iron, \$18.35 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham				
		Feb. 14, 1922	\$18.02	
		Jan. 24, 1922	18.89	
		Feb. 22, 1921	26.76	
		10 year pre-war average	15.72	

sumers. Having access to so much non-union coal, steel makers in the Pittsburgh district are not seriously perturbed over the strike possibility and while indications point rather strongly to a strike or a suspension of union mines over the wage question, there is a belief that Government intervention may come before the crisis is reached. The prospect of trouble is looked upon pretty calmly here, not only because there has been a good deal of quiet stocking of coal, both by the railroads and industrial consumers during the past few weeks, but because business is not so heavy or urgent that a suspension would be looked upon as serious.

Steel prices do not change much, but as a general proposition they lean in favor of buyers. The American Sheet & Tin Plate Co. yesterday opened its books for second quarter business, naming the same prices as for first quarter orders. This interest also has reaffirmed the base of \$4.75 for tin plate on second quarter contracts from jobbers. The market is at least steady on these products, although intimations of con-

cessions still are common, and on merchant steel bars there appear to be no important deviations from 1.40c. base. The market is not very firm at 1.40c. for beams and plates nor for other finished steel products not specifically referred to.

A flurry in the coke market last week strengthened coal prices, but prices of both products this week show a reactionary tendency. The scrap market has strengthened slightly as a result of purchases of some of the mills outside of Pittsburgh, which serve to bring to the surface the meagerness of available supplies.

Pig Iron.—There is a distinctly firmer tone to the market, due partly to a somewhat larger demand, which shows more strongly in foundry than in the other grades, and partly to an increasing unwillingness on the part of producers to meet prices recently done. A sanitary ware manufacturer with plants in this district and in the South has bought about 1500 tons for each plant, or a total of 4500 tons of foundry iron for March delivery. On Northern iron, this interest was

able to buy a No. 2 Valley iron at \$18.75, but paid \$19 at furnaces outside the Valley district, which, however, have slightly lower freight rates to point of consumption than the Valley furnaces. This interest also was able to buy some No. 2 foundry iron from Valley furnaces at \$19. On its Southern iron, some of the tonnage was secured at \$15, Birmingham. The National Radiator Co. is in the market for 2000 to 2500 tons of No. 2 and No. 2X foundry, for March, April and May delivery in equal amounts to its New Castle and Johnstown, Pa., plants. Producers now are generally quoting \$19, and it is claimed that some fair sized lots have been placed at this price in the past few days. Western Pennsylvania furnaces probably will be able to do more business in Johnstown from now on, as it is reported that the stock of the Cambria Steel Co., which had been on foundry grade, lately was shifted over to steel making iron. In addition to a purchase of 1000 tons of basic, a Pittsburgh district sheet maker also has taken 300 tons of Bessemer which it is understood will come from Johnstown, Pa. The rate from that point to destination is the same as from the Valley, or \$1.96, and the sales price is understood to have been around \$19. Valley furnaces having any of this grade for sale are holding to \$19.50, but middlemen have lately been taking small lots about 25c. below that price.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$17.75 to \$18.00
Bessemer	19.50
Gray forge	18.75 to 19.00
No. 2 foundry	18.75 to 19.00
No. 3 foundry	18.75 to 19.00
Malleable	19.00

Ferroalloys.—A Valley steel maker who recently inquired for 100 tons of 16 to 19 per cent spiegeleisen is reported to have covered this requirement at \$30 delivered and the price of \$30, furnace, recently named by an Eastern maker, remains merely a quotation as far as sales in this and nearby districts are concerned. Interest in ferroalloys generally is pretty low in this district and prices largely are nominal. Despite the recent cut of \$2 per ton in Jackson, Ohio, prices of Bessemer ferrosilicon, the advantage in price still is with producers making this material in the electric furnace, and the former moves slowly. On 50 per cent ferrosilicon a price of \$55, furnace, freight allowed, still is being made, though the more common range is from \$57 to \$60. The recently established prices for ferromanganese have not yet found basis in sales.

We quote 78 to 82 per cent ferromanganese, \$62.50 c.i.f. Atlantic seaboard for domestic and English and \$58.35 for German. Average 20 per cent spiegeleisen, nominal; 16 to 18 per cent, \$30 to \$35, delivered Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$36.50; 11 per cent, \$39.50; 12 per cent, \$43.10; 13 per cent, \$47.10; 14 per cent, \$52.10. Silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$27.50; 9 per cent, \$29.50; 10 per cent, \$31.50; 11 per cent, \$34; 12 per cent, \$36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is beginning to reflect the recently enlarged movement of finished products, but this is seen more in freer specification against contracts than in new business, although sales are slightly more numerous than they were recently. A middle interest is seeking 200 tons of slabs and inquiries for forging billets are coming to makers with a little more frequency than recently was the case. Prices do not change much, but since there is considerable competition between Pittsburgh and Valley mills, equalization of freights is common practice.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$29, 2 x 2-in. billets, \$29 to \$30; Bessemer and open-hearth sheet bars, \$29 to \$30; slabs \$29 to \$30; forging billets, ordinary carbons, \$32 to \$33, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand is moderate and with business in finished products possible only at concessions from regular prices, considerable difficulty is experienced in selling rods at recent levels. We note a fair-sized sale of screw stock rods at \$40, mill, and on soft rods, \$36 lately

has been maximum, while sales have been done as low as \$35. Buyers seem willing to pay the latter price and usually find accommodation. Prices are given on page 559.

Steel Skelp.—Open market inquiries are so few and small that prices are indeterminate. Makers still quote 1.50c. for pipe skelp, but this may be regarded merely as a negotiation quotation, which would be shaded, probably to the plate base, on the appearance of sizable inquiries.

Wire Products.—There is no lack of inquiry from the jobbers, most of whom are going along with light stocks and who appear to want to prepare for the spring demand, but actual business is kept down by the uncertainty over prices. Practically all manufacturers are taking business from the larger distributors at \$2 per ton below the Dec. 15, 1921, prices and the smaller factors seem to believe they should be able to buy at the same prices. It is because manufacturers are unwilling at the moment to meet this demand or to give guarantees against a decline in prices that larger orders are not being booked.

We quote wire nails at \$2.40 to \$2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.15 to \$2.25 base per 100 lb., Pittsburgh.

Steel Rails.—The market is definitely weaker on light rails with prices off \$1 to \$2 per ton from recent levels. In the immediate Pittsburgh district, makers of these sections, rolling them from new steel, are able to obtain 1.45c. base, but to the East as low as 1.40c. has been done and some business has been lost at that price to mills rerolling old standard sections.

We quote 25 to 45-lb. sections, rolled from new steel, 1.40c. to 1.45c. base; rolled from old rails, 1.35c. to 1.40c. base; standard rails, \$10 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Suggestions that business in merchant steel bars has been taken as low as 1.35c., Pittsburgh, are denied by makers here, at least as far as Pittsburgh and nearby points are concerned. Demands are not large, but they are fairly numerous and it is insisted that 1.40c. is minimum. However, there is not much support for a higher price, even on small lot orders. Makers of refined iron bars still are holding to 2c., minimum, for carload lots.

We quote steel bars rolled from billets at 1.40c.; reinforcing bars, rolled from billets, 1.40c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.35c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Fabricating companies in this district are busy in their estimating departments, but not in their shops. Only small lot jobs are coming out in this district. Plain material is slow of sale and the accepted base now is 1.40c., even on comparatively small tonnages. Prices are given on page 559.

Sheets.—The American Sheet & Tin Plate Co., as of Feb. 20, opened its books for second quarter business, naming the same prices as it quoted for the present quarter, or 3c. base for black, 4c. base for galvanized and 2.25c. base for blue annealed. It is stated in explanation for the comparatively early announcement of second quarter prices that there were a number of inquiries for that delivery. Affirmation of present prices by this interest should serve to dispel suggestions of higher prices which have been heard lately in some quarters. There is a pretty general observance of present prices on black and galvanized sheets where new rollings are involved, but stock material can be bought at concessions and it is a fact that some contracts placed \$5 per ton below current quotations have more elasticity than they were intended to have. Demand is steady rather than active, with not much anticipation of needs. The Steel Corporation sheet making subsidiary this week is operating more than 70 per cent of its mills, with the independents running about 50 per cent. Prices are given on page 559.

Tin Plate.—Current demands are light, but the mills keep well engaged on contract specifications. February is never a very active month, but by comparison with other years, it is showing relatively well this year. The

American Sheet & Tin Plate Co. has announced a price of \$4.75 per base box, Pittsburgh, on second quarter contracts from jobbers.

We quote standard production coke tin plate \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Plates.—There is some business pending in connection with tank and large size pipe inquiries, but in a broad sense the market is quiet and buyers are confining their purchases closely to actual needs. The going market is 1.40c., but since this prevails on small tonnages, there is a common impression that sizable orders could be placed at 1.35c.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.40c. f.o.b. Pittsburgh.

Hoops and Bands.—The market does not appear to be quotable at above 1.90c. on either product, although the official quotation on hoops still is 2c. A range of 1.75c. to 1.90c. is quoted on bands, while some business in hoops has been placed at 1.80c.

Hot-Rolled and Cold-Rolled Strips.—Buyers continue to take supplies only as they are needed, and while a fair number of orders is being placed, the aggregate leaves much to be desired. On cold-rolled strips there is not much deviation from the 3.50c. base, but on comparatively attractive orders for hot-rolled strips the regular quotation of 2c. is being shaded as much as \$3 and \$4 per ton.

Iron and Steel Pipe.—Makers of both steel and wrought iron pipe are enjoying a reasonably good business with orders and specifications showing almost as great a gain so far this month over January as that month showed over December. In steel pipe, orders for oil country goods lately have been gaining and with some makers they are as large as those for merchant pipe. Line pipe inquiries are fairly numerous and it is believed one for 98 miles of 12-in. for a gas line from Monroe to Alexandria, La., inquired for by the Hope Engineering & Supply Co., Mount Vernon, Ohio, will be closed soon. Observance of the Dec. 16 price card is not particularly rigid, with rather low prices being named on line pipe. Plant operations are higher than are warranted by current orders, but there is some stocking in anticipation of plant suspension in the event of a strike of the union coal miners. Card discounts are given on page 559.

Boiler Tubes.—Business is picking up in steel tubes, but there are not enough orders to give all makers a share and price cutting still is pretty common. There are no established quotations on seamless tubes and the quoted discounts on lapwelded goods frequently are supplemented by an additional 5 per cent. Iron tubes are relatively firm. Discounts are given on page 559.

Nuts and Bolts.—Business is no more than it has been, but it does not show much increase either, and as far as makers in this district are concerned, it is pretty much localized, due to the fact that on most sizes and styles, buyers can save money by placing business with mills having a lower freight rate than those observing the Pittsburgh base. Demand is purely hand-to-mouth. Discounts are given on page 559.

Cold-Finished Steel Bars and Shafting.—There is just a fair demand for screw stock and shafting, purchases of which for the most part merely are for the rounding out of stocks. Jobbers in some parts of the country still have unliquidated stocks and the agricultural implement industry has had little opportunity to work off big purchases of 1920. Stocks in distributing and consuming hands as a whole are small by comparison with what they have been in recent years, but this is not necessarily a favorable augury. It is recognized that even when general business returns to its normal stride, there will hardly be a repetition of the urgent demands of early 1920 and consequently not the necessity for consumers and jobbers to carry big stocks. For some time it is probable that supply will be sufficient for all demands, and so long as delivery can be made in two or three weeks, buyers will feel safe with about half the stocks they formerly carried. The "official" quotation on cold-rolled or cold-drawn steel bars still is 2c., but 1.90c. is the more common maximum and even that price is being shaded against occasional orders of attractive features. Ground shafting is unchanged at 2.25c., base, mill, for carloads.

Rivets.—The market is very largely a buyer's affair, and while an effort is being made to maintain \$2.25 to \$2.35, base, per 100 lb. on heavy rivets, it is frankly admitted that these prices are being obtained only on retail lots and that attractive orders can be placed \$2 to \$3 per ton less. Prices and discounts are given on page 559.

Spikes.—No information yet has been received here as to the disposition of the 30,000 to 40,000 kegs of spikes for the New York Central Lines. It is rumored that the order has been divided between the Lackawanna Steel Co. and Jones & Laughlin Steel Co., but the latter company has no official advices with regard to the order. Prices on standard spikes still are inclined lower and the common belief is that the New York Central business will be placed at less than \$2.15, base, per 100 lb., the minimum public quotation of makers. Prices are given on page 559.

Coal and Coke.—Two or three good-sized orders for furnace coke last week resulted in such a complete cleaning up of available tonnages that the advance of the previous week was further extended, some sales being made as high as \$3.50 per net ton ovens. Demands having been satisfied, however, the market this week has grown weaker and \$3.25 now appears to be as high as any business can be done. Higher prices for coke have naturally enhanced the appraisal value of coal, but there has not been sufficient demand to sustain the advance and the market is weaker this week. Some business in by-products coal was done as high as \$2 at mines, for run-of-mine, but in the past few days the market has settled back to \$1.85 as a maximum, with some tonnages available at less. The current price on steam coal for spot tonnages is right around \$1.50 for mine-run grade, while non-union gas coal can be bought at \$1.90 for spot or prompt shipment. Foundry coke for spot shipment ranges from \$4 to \$4.50.

Old Materials.—The market has grown distinctly firmer on the steel works grades since a week ago, due to purchases by mills outside the Pittsburgh district proper. Some of these melters who ordinarily charge light scrap, unable to obtain tonnages except at relatively stiff prices, have turned to the heavier grades and this demand has stiffened prices. Neither dealers nor consumers lately have been able to obtain even carload lots at less than \$14. A price equivalent to about \$14.50 at Pittsburgh has been paid by Youngstown mills. The market has been helped not only by the slightly heavier demand, but also by light offerings. Dealers are not pressing yard stocks for sale and current production is restricted by the light operations of producing industries. Only small lots of compressed or bundled sheet scrap are coming out because of that condition. There is not much demand for the foundry grades.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Polanshee, Brackenridge, Monessen	
Midland and Pittsburgh	\$14.00 to \$14.50
No. 1 case, cupola size	16.00 to 16.50
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Huntington, W. Va., and Franklin, Pa.	15.00 to 15.50
Compressed sheet steel	12.00 to 12.50
Bundled sheets, sides and ends	10.75 to 11.25
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	17.00 to 17.50
Low phosphorus plates and other grades	16.50 to 17.00
Railroad malleable	12.50 to 13.00
Iron car axles	23.00 to 24.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	14.50 to 15.00
Cast iron wheels	15.00 to 15.50
Roller steel wheels	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.50 to 12.00
Short shoeing turnings	11.00 to 11.50
Heavy breakable cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Cast iron borings	11.00 to 11.50
No. 1 railroad wrought	11.50 to 12.00

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until Feb. 28 for 65,000 lb. of slab zinc for use at the Norfolk, Va., navy yard.

New York

NEW YORK, Feb. 21.

Pig Iron.—Interest is centered in the bids for the segments for the New York-New Jersey vehicular tunnel, and while nothing definite is known except the names of the firms that have been figuring with the successful bidders, Booth & Flinn, it is generally expected that contracts for the segments are likely to go to the Federal Shipbuilding Co., the Bethlehem Steel Co. and Davies & Thomas. The tonnage may be divided among these three, or some of it may go to others, but the three concerns named are considered as best equipped to do the work. Davies & Thomas have done a large part of the work on previous tunnels at their plant at Catasauqua, Pa., and the Bethlehem Steel Co. is considered especially well equipped. Outside of the tunnel business no large tonnages are being figured on, but the Essex Foundry Co., Newark, N. J., is in the market for from 500 to 1000 tons of No. 2X for delivery after March 1, and it is understood that the contract will not be made until next week. Numerous smaller inquiries are pending and the most encouraging feature of the situation is that a large number of foundries report increasing melt.

We quote delivered in the New York district as follows, having added to furnace prices \$52 freight from eastern Pennsylvania, \$5.16 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 75 to 3 25...	\$23.52
East. Pa. No. 2X fdy., sil. 2 25 to 2 75	23.62
East. Pa. No. 2 fdy., sil. 1 75 to 2 25...	22.52
Buffalo, sil. 1 75 to 2 25	\$23.16 to 23.71
No. 2 Virginia, sil. 1 75 to 2 25	23.16

Ferroalloys.—Demand for ferromanganese is not heavy, sales being confined to carload lots and inquiries totaling about 500 tons. Quotations are unchanged at the higher levels recently put into effect. The spiegel-eisen market continues fairly active in the absence of stocks of the 20 per cent grade, and in the belief that the quantity of the 16 to 19 per cent grade available is small. Inquiries before the market amount to about 1000 tons, but there has been no change in the asking price from that announced a week ago. There have been no developments in the manganese ore market, but from offerings that have appeared from sellers it is likely that high-grade foreign ore could not be purchased at less than 25c. to 26c. per unit, seaboard. The 50 per cent ferrosilicon market is quiet and firm at unchanged levels, sales being confined to carload lots, several having been sold in the past week, among which is noted one carload at \$59, Chicago. The recent reduction in quotations for Bessemer ferrosilicon of \$2 per ton is understood to have been caused by the competition of electric ferrosilicon of approximately the same percentage content of silicon, as well as the fact that the 50 per cent grade can be used to advantage and bought as cheaply as Bessemer in proportion to the silicon content. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	\$62.50
Ferromanganese, British, seaboard, per ton	\$62.50
Spiegel-eisen 16 to 19 per cent, furnace, per ton	\$30.00
Ferrosilicon, 50 per cent, delivered, per ton	\$50.00 to \$60.00
Ferrotungsten, per lb. of contained metal 40c. to 50c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovandium, per lb. of contained vanadium	\$4.00

Ores

Manganese ore, foreign, per unit, seaboard, 25c. to 26c.	
Tungsten ore, per unit, in 60 per cent concentrates	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$25.00 to \$27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York	50c. to 60c.

Finished Iron and Steel.—Betterment is difficult to measure except through increasing mill operations. There is evidence that the small replenishment orders are making a gradually increasing aggregate, although in an individual selling office the daily volume fluctuates so that it is difficult to define the trend. Fabricated steel work still remains active, though there is at the moment a drop in the total of fresh projects. The East is not as yet getting any sizable railroad equip-

ment business. Uncertainty exists with regard to the stability of wire and wire products prices and there are intimations that better than 1.40c. Pittsburgh can still be done on large orders for plates, shapes and bars. About the only structural project which has come to light covers 100 tons for the American Car & Foundry Co., Huntington, W. Va. For the shields for the vehicular tunnel under the Hudson river 9000 to 11,000 tons of steel work will be required. Awards were in part as follows: New York Cotton Exchange, 4000 tons, to Post & McCord; West Penn power house, Wellsburg, 2900 tons, to Fort Pitt Bridge Works; apartment house, Kingsbridge Road and Grand Concourse, New York, 850 tons, to Levering & Garrigues Co.; Orient Life Insurance Co., Hartford, 500 tons, to Levering & Garrigues Co.; apartment house, 108th Street and Riverside Drive, 1000 tons, to A. E. Norton Co.; shelters for the Pennsylvania Railroad at Jersey City, 300 tons, for which the Triest Contracting Corporation is the general contractor; plate girders for the New York Central at Tonawanda, N. Y., 300 tons, to Lackawanna Bridge Works Corporation; United States Gypsum Co., Oakfield, N. Y., 106 tons, to the Lackawanna Bridge Works Corporation; tanks for Mexican Petroleum Co., 2 at Providence, 2 at Portland, Me., 700 tons, to the American Bridge Co. Outside of car repair contracts for the Boston & Maine and the Norfolk & Western, about the only Eastern railroad work covers 50 suburban cars awarded to the Harlan & Hollingsworth plant of the Bethlehem Steel Co. The Great Northern placed an order for 500 refrigerator cars with the General American Car Co. and is in the market for 250 gondolas and 500 stock cars. The Pacific Fruit Express Co. will probably buy 3300 cars and the St. Paul may buy 2000 cars. Car builders are inclined to believe that there will be plenty of business to satisfy the plants of the country by the latter half of the year.

We quote for mill shipments New York, as follows: Soft steel bars, 1.75c. to 1.88c.; plates, 1.75c. to 1.88c.; structural shapes, 1.75c. to 1.88c.; bar iron, 1.75c. to 1.88c. On export shipments the freight rate is now 23.5c. per 100 lb., instead of 23c., the domestic rate.

High Speed Steel.—The market continues dull with sales of extremely small quantities only reported. There is some shading of prices and a fair estimate of the market on 18 per cent tungsten high speed steel is probably 80c. to 90c. per lb. with special brands of some companies selling up to \$1.05 per lb.

Cast-Iron Pipe.—Optimism still prevails in this market and purchases by private consumers are slightly larger than usual. At present no municipal lettings are in sight in this district excepting the pipe involved in the Hudson River vehicular tunnel, which will be purchased by Booth & Flinn, Ltd., New York. The Metropolitan Water Supply Co., Boston, has closed on 3000 tons of 12-in. to 24-in. cast iron pipe with the Warren Foundry & Machine Co. The 600 tons of pipe, to be purchased by contractors with municipal contracts in New York, has not yet been bought. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Warehouse Business.—The market is fairly active, the increase in business during the past few weeks being well maintained. Warehouses carrying structural material continue to report more than usual activity, but it is believed that there has been some shading of quoted prices along this line. A domestic and export seller in this district is offering a fairly large tonnage of structural material, bars, angles, beams, channels and plates, at a price of \$28 per ton, f.o.b. point of shipment. This is, however, probably canceled material. Sheets are slightly stiffer on small lots, but a satisfactory tonnage of galvanized or black sheets would bring out a good concession. In general, prices in this line are uneven. Offerings of one company of new galvanized and black sheets at considerably under the prevailing prices are said to be seconds. The railroads are buying small lots of special steels. German tool steel is being offered by a Philadelphia importer at 7.75c. per lb., f.o.b. Hamburg, which is about 9c. per lb. New York. The wrought iron and steel pipe mar-

ket is quiet. Brass rods have dropped 1/2c. per lb. from 14 1/4c. to 14 1/8c. per lb. We quote prices on page 576.

Coke.—The Eastern By-Product Coke Co. has quoted \$4.50 on 700 tons per month for the coke which will be required by foundries making segments for the new vehicular tunnel, and it is understood that another company named even a lower figure, but it was not accepted. Owing to the fact that coal has been sold readily and that there is an active demand for coke due to fear of a strike in the bituminous regions April 1, a number of Connellsville coke operators have found themselves unable to make deliveries at an early date and have withdrawn from the market. It is expected that some of these operators will be back in the market in a few days, but others may be out for a month or more. The price has been advanced 25c., and \$4.25 seems to be the lowest obtainable price on high grade foundry coke. By-product coke continues to be quoted at \$8.50, delivered New Jersey points, this being on the basis of \$4.25 for Connellsville coke at ovens and \$4.34 for freight. An advance in the price of by-product coke does not seem to be probable.

Old Material.—The market has been rather inactive during the past week and most dealers are offering slightly lower prices, except for heavy melting steel, which is still fairly firm at \$7.50 to \$8.00 per ton. Small contracts continue to be made on No. 1 heavy melting steel from time to time. The Lukens Steel Co. is reported to have ordered resumption of shipments on old contracts. The Midvale Steel & Ordnance Co. is paying \$12.50 per ton for No. 1 heavy melting steel, delivered Coatesville, and the American Bridge Co. \$11.50, Pencoyd. One broker in this district has reduced his buying prices on several items by 50c. per ton. No. 1 railroad wrought iron car axles and wrought iron track all show a slight reduction from the previous week's quotations.

Buying prices per gross ton New York, follow.	
Heavy melting steel, yard	\$7.50 to \$8.00
Steel rails, short lengths or equivalent	8.00 to 8.25
Revolving rails	9.25 to 9.75
Relaying rails, nominal	27.00 to 28.00
Steel car axles	10.00 to 10.50
Iron car axles	17.50 to 18.50
No. 1 railroad wrought	9.50 to 10.00
Wrought iron track	8.00 to 8.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	7.00 to 7.50
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	7.25 to 7.75
Stove plate	10.00 to 10.50
Locomotive grate bars	9.00 to 9.50
Malleable cast (railroad)	8.00 to 8.50
Cast iron car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton, follow:

No. 1 machinery cast	\$16.50 to \$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Birmingham

BIRMINGHAM, ALA., Feb. 21

Pig Iron.—More orders were booked by Birmingham iron makers the past week than in many months. The iron goes over a more scattered territory than has been the case since the industrial slump began. Alabama iron is going to more foundries in competitive territories than it has done in practically a year. One maker booked 15 carloads in one day, the total representing 11 different customers from St. Louis, Michigan, Illinois and Indiana to Florida, the Carolinas, Texas and Pacific Coast. The last-named business is on a continuous base and bids fair to remain so pending the excellent ocean rates prevailing. The Sloss-Sheffield Steel & Iron Co.'s initial shipment from its Sheffield stack in extreme northern Alabama to Metropolis for St. Louis, Chicago and Northwestern distribution is scheduled to take place this week and to consist of 1600 tons in 400-ton barges with delivery in 40 hours. This delivery was the experience of the company with the same transportation agency, the Arrow Transportation

Co., before the war. This river shipping does not appear to have cut into business in the same territory done by Birmingham makers. St. Louis took several lots last week at \$15.50. That was also the base on sales into Michigan and other north of Ohio River points. Pacific Coast business is the choicest, being done on a base of \$16. Two operators say they will ship their make and reduce yard stocks this month. One maker booked over 3000 tons in small lots during the week. Most of the business comes without solicitation, the market base of \$15.50 appearing to be very generally accepted with \$16 charged under certain circumstances. Indications point to greater furnace capacity incident to evidently large melt to be made by the high pressure pipe shops. The feeling in industrial circles is more buoyant than it has been at any time in many months.

We quote per gross ton for Birmingham district foundries as follows:

Foundry silicon 1.75 to 2.25	\$15.50 to \$16.00
Basic	14.50 to 15.00
Charcoal, warm blast	\$2.00

Cast Iron Pipe.—High pressure pipe plants of the National Cast Iron Pipe Co. and the American Cast Iron Pipe Co. are not far from capacity. United States Cast Iron Pipe & Foundry Co. will make the 2000 tons for Portland, Ore., here and ship by Mobile. The Seattle order is also expected here. National Cast Iron Pipe Co. is finishing an order for 1000 tons for Port Arthur, Texas, and has, among other orders, one for 1200 tons for St. Paul. American Cast Iron Pipe Co. booked Wisconsin orders for 1000 tons. A vessel is putting in at Mobile to load with 3000 tons of pipe for the Pacific Coast.

Finishing Mills.—The Tennessee company is shortly to blow in No. 4 blast furnace at Ensley, making five on basic iron there. Open hearth demand continues operation of seven of the nine furnaces.

Coal and Coke.—Demand for coke is stronger and shipments are larger. The price remains at about \$5 for standard foundry.

Old Material.—Scrap dealers begin to look for improvement incident to what seems to be a prospect of a real expansion of steel and iron foundry business. Very little business is being done now.

We quote per gross ton for Birmingham district yards as follows:

Steel rails	\$11.00 to \$12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Feb. 21.

Pig Iron.—The majority of sales are made at \$18.50 base, but in general the volume is small. An inquiry for 5000 tons from outside the district has reached several furnaces and two have responded with the \$18.50 price. The average run of orders ranges from carload lots to 200 tons. Generally, inquiry is light and without particular feature. Furnace operation is maintained on the same basis which existed at the beginning of the year and the whole selling object is summed up as that of liquidation rather than doing business on a profitable basis.

We quote for per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$19.50 to \$20.00
No. 2X foundry, 2.75 to 2.75 sil.	19.00 to 19.50
No. 2 plain, 1.75 to 2.25 sil.	18.50 to 19.00
Basic	18.00 to 18.25
Malleable	19.50
Lake Superior charcoal	31.75

Warehouse Business.—An increase in the number of orders and in the volume of inquiry within the last 10 days is an encouraging sign. Much of this business is for maintenance work and is indicative of easier conditions in factories and shops. There are many evidences of anxiety to get equipment in good order.

Finished Iron and Steel.—The anticipated adjustment of prices on wire products which buyers believed

would be announced last week but did not develop, had a quieting effect on demand for those products. Sheet inquiry has been brisk, but much of this activity is taken to mean that buyers are circulating requests for prices with a view to finding a break in the uniformity of prices. With all mills quoting \$3 on black sheets, there is little advantage in "shopping" and the inquirers who thought they could find a weakness have been disappointed. Bar prices, however, are not as firm. Quotations range from 1.40c. to 1.50c. Some inquiry on irregular sizes has developed, but one agency has declined to bid because mills are not rolling the material sought, and the tonnage is not sufficient to change the roll. Some rod inquiries have been made by nail manufacturers and some requests for prices on reinforcing bars are also out. Structural affairs are quiet; plans for the Buffalo Athletic Club are ready, but structural requirements have not been announced.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.65c.; plates, 2.65c.; plates, No. 8 gage, 3.35c.; soft steel bars and shapes, 2.55c.; hoops and bands, 3.15c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.40c.

Coke.—Inquiry is lively and is attributed to the strike possibility. Best grades are quoted at \$4 to \$4.25 ovens.

Old Material.—Because of the light production and the disposition of dealers to retain their stocks for better prices, the market is slow and demand for most materials fairly brisk. The price situation on heavy melting steel is unchanged and dealers willing to sell at \$13.50 could find plenty of business. Turnings and borings are also much in demand.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$13.00 to \$14.00
Low phosph. 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 bushelling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

St. Louis

ST. LOUIS, Feb. 21.

Pig Iron.—The new market price of \$20, Chicago, for Northern iron, made rather suddenly in Chicago last week, seems firmly established in this territory. The advance is being followed by producers in Granite City. Sales for the last week, although still largely confined to carloads for immediate shipment, showed an improvement, and there was a better tone to the market, a condition helped by the advance. The \$20 price for Northern iron gives Southern iron at \$15.50, Birmingham, an advantage of \$1.50 a ton, St. Louis, on all-rail shipment, and an even greater advantage on the Sheffield water and rail movement, which affords a saving of 80c. as a differential and \$1.50. For the first movement by barge from Sheffield to Metropolis, Ill., and thence by rail, there were two barge loads sold here; one each for Bridge & Beach Mfg. Co., and the Enterprise foundries in Belleville. The largest inquiry pending is for 2000 tons for March and April shipment for an Illinois melter. The Mt. Vernon Car Mfg. Co. has an inquiry out for 1000 to 2000 tons, of which 200 tons is to be delivered during February and the remainder at the rate of 100 tons a week. Another Illinois melter wants 500 tons of foundry iron for March and April shipment.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.80 freight from Chicago and \$.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	\$22.80
Northern malleable, sil. 1.75 to 2.25	22.80
Basic	22.80
Southern foundry, all rail, sil. 1.75 to 2.25	21.21
Southern foundry, sil. 1.75 to 2.25, rail and water	19.44

Finished Iron and Steel.—The most important development of the week was the announcement of J. M.

Kurn, president of the St. Louis & San Francisco Railroad, of plans to expend \$7,766,000 on improvements, of which \$5,500,000 is to be for track and grade improvements, and more than \$2,000,000 for new or re-strengthened equipment. It is planned to spend \$1,385,000 for laying of double track, and the laying of 185 miles of new 90-lb. rails at different points and 100 miles of relay rails. Eight 70-ft. all-steel passenger coaches and six 70-ft. all-steel chair cars will be bought at an estimated cost of \$435,000. No inquiries covering this material have been issued by the purchasing department of the road. The Union Pacific Railroad bought a carload of wheels, and 100 tons of wire rods also were purchased by a Missouri River concern. The Missouri Pacific Railroad is planning to buy more than 5000 tons of 90-lb. rails. The demand for structural steel here is still light because of the wage situation. Figures submitted for the proposed new Jewish Hospital at Memphis, involving 300 tons of reinforcing bars, are greater than the promoters had expected, and it is likely that new bids will be asked for.

For stock out of warehouse we quote: Soft steel bars, 2.62½c. per lb.; iron bars, 2.62½c.; structural shapes, 2.72½c.; tank plates, 2.72½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52½ per 100 lb.; boiler rivets, \$3.62½; tank rivets 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-15 per cent; hot pressed nuts, square or hexagon blank, \$4, and tapped, \$3.75 off list.

Coke.—The business in coke is increasing, although most of the orders being placed are for carloads and for immediate shipment. The most encouraging feature is the steady increase in shipping instructions against contracts, more especially from the producers of lead in the Oklahoma-Kansas-Missouri districts. Granite City by-product producers have renewed contracts for 30,000 tons for shipment over 12 months. Domestic coke is only in fair demand, because of warmer weather.

Old Material.—The situation is unchanged, the market remaining dull and sluggish. The large consumers are still out of the market, and will not make any further purchases this month. Although economy of operation could be effected by unloading old material direct from railroad cars to charging boxes, consumers prefer not to make such cash outlays and are still using their reserve stocks at higher prices. The only railroad list before the market this week was issued by the Texas & Pacific Railway aggregating 1750 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	\$14.00 to \$14.50
Steel rails, rerolling	10.50 to 11.00
Steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section	23.00 to 28.00
Cast iron car wheels	13.50 to 14.00
No. 1 heavy railroad melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.75 to 10.00
Ordinary shoveling steel	9.50 to 10.00
Frogs, switches and guards, cut apart	10.00 to 10.50
Ordinary bundle sheet	4.00 to 4.50
Cast steel bolsters	9.50 to 10.00

Per Net Ton	
Heavy axles and tire turnings	6.00 to 6.50
Iron angle bars	13.00 to 13.50
Steel angle bars	9.00 to 9.50
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealer's forge	8.00 to 8.50
Cast iron borings	5.50 to 6.00
No. 1 bushelling	8.50 to 9.00
No. 1 bolters cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	11.00 to 11.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	5.50 to 6.00
Light railroad sheet	3.50 to 4.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	3.00 to 3.50
Country mixed iron	6.00 to 6.50
Uneut railroad mixed	7.00 to 7.50
Horseshoes	9.50 to 10.00
Railroad brake shoes	9.50 to 10.00

Cleveland

CLEVELAND, Feb. 21.

Iron Ore.—The first ore sale reported for this season was made during the week, this being 1500 tons of manganiferous ore which was bought by a St. Louis consumer. The purchaser will pay whatever market price is established later in the season. Recently a sale of 10,000 tons of manganiferous ore was made for use in manufacturing spiegel, but this was a resale lot to be shipped from Lake Erie docks. Mining companies are making estimates of probable mining costs for the season with a view of arriving at conclusions as to what ore prices should be. Some of the independent mining companies that are paying wage scales below those of the Steel Corporation regard their present wage scales as a temporary expedient in order to keep the men at work and say they will probably use the Steel Corporation's wage schedule as a basis for figuring mining costs.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45. Old range non-Bessemer, 51½ per cent iron, \$5.70. Mesabi Bessemer, 55 per cent iron, \$6.20. Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—Sales increased during the week and included some good-sized orders. The action of Chicago producers in marking up prices has resulted in a stiffening by one lake furnace, but this appears to be mostly on iron for shipment to points at which Chicago furnaces can enter competition, as this producer is still quoting foundry iron at \$18.50 in some cases. With this market firmness in one direction, lake furnaces apparently will meet keener competition with southern iron in central and southern Ohio, as further concession of 50c. a ton has been made in Alabama iron on the inquiry from the Standard Sanitary Mfg. Co. for its Louisville plant, which brought out a \$15 base price. On foundry iron \$19 appears to be the more general quotation by lake furnaces except for delivery to points where competition is sharpest. The Standard Sanitary Mfg. Co. has purchased 1000 tons and the United States Sanitary Co. 300 tons of foundry iron from a Valley furnace, both at \$19 and we also note the sale of 1000 tons of foundry iron to a Michigan automobile foundry and 1000 tons of malleable iron to an Ohio foundry at the same price. A lake furnace that booked the two last mentioned orders also sold about 4000 tons additional during the week in small lots. Locally the demand has increased, a number of small foundries buying small lots at \$19.50 to \$20 at furnace. Sales of three lots of Ohio silvery iron aggregating 500 tons were made to Cleveland foundries at the new price. Shipments continue to improve and one producer expects that its February shipments will be 50 per cent greater than in January. The Hanna Furnace Co. blew in its Dover furnace Feb. 18 and Pickands, Mather & Co. will put their Perry furnace at Erie, Pa., in blast this week.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.35 rate from Jackson and a \$6.67 rate from Birmingham:

Basic		\$19.71
Northern No. 2 fdy., sil.	1.75 to 2.25	\$19.00 to 20.00
Southern fdy., sil.	1.75 to 2.25	21.67 to 22.17
Ohio silvery, sil.	8 per cent	30.86
Standard low phos., Valley furnace		32.00

Finished Materials.—The demand for finished materials shows a further improvement and has broadened, orders being well scattered from various manufacturing industries. Fabricating shops which have been buying plates and shapes only for specified work are now adding some additional material for stock. The price situation shows little change. On steel bars, plates and structural material 1.40c. is the minimum price and that is being quoted only on the more desirable orders, the greater percentage of the business being booked at 1.45c. to 1.50c. The structural outlook continues to improve. The Fort Pitt Bridge Works has taken 350 tons for the auditorium for the National Cash Register Co., Dayton, and bids have been taken for 300 tons for a building for the Commercial Savings Bank & Trust Co., Toledo. An inquiry has come out for 600 tons for the Kresge Store Building, Cleveland. Lake shipyards have received another inquiry for a

freight boat, this making three inquiries now pending for lake boats, each involving 4000 tons of steel. Some business is coming from the automotive industry and among the week's orders was one for 420 tons of spring steel.

Jobbers quote steel bars, 2.36c., plates and structural shapes, 2.46c., No. 9 galvanized wire, 3c.; No. 9, annealed wire, 2.50c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 2.96c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—The improvement noted in other lines has not extended to the sheet market, which is quiet. While regular prices are holding well there is an occasional report of a concession to 3.75c. on galvanized sheets.

Warehouse Business.—Local warehouses have reduced prices on wire and nails. Warehouse orders show an improvement.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved materially, but buying is mostly in small lots. A broadening is noted in the demand. Some orders are now coming from the implement manufacturers. Prices still lack firmness. The leading local rivet manufacturer reduced prices Feb. 18 \$3 a ton, making structural rivets 2.10c. and boiler rivets 2.20c. Some makers had recently shaded prices to this extent. Small rivets are weak, quotations of 75 and 10 per cent off list appearing.

Coke.—Prices have stiffened slightly, but the demand has quieted. We quote standard Connellsville foundry coke at \$4 to \$4.50.

Old Materials.—The improvement in steel plant operations has not resulted in any better demand for scrap and the market was unusually dull during the week. Prices are still inclined to weakness, this being particularly true of blast-furnace scrap. Prices on borings and turnings have declined about 25c. a ton. There is a limited demand from Cleveland dealers for turnings to fill old orders with a local mill and they are offering \$9 for this grade. Some inquiry has come from Pittsburgh foundries for prices on couplers, knuckles and coil springs. These prices are to be used as a basis for quoting prices on railroad castings.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	\$12.00 to \$12.50
Steel rails, under 3 ft.	12.50 to 13.00
Steel rails, re-rolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	15.00 to 16.00
Low phosphorus melting	13.00 to 13.50
Cut borings	9.00 to 9.25
Machine shop turnings	8.50 to 8.75
Mixed borings and short turnings	8.50 to 8.75
Compressed steel	9.00 to 9.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.50 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 bushing	8.75 to 9.00
Drop forge flashings, over 10 in.	7.75 to 8.00
Drop forge flashings, under 10 in.	9.00 to 9.25
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

J. C. Reed has organized the Reed Railway Supply Co., of which he is president, with offices in the Railway Exchange Building and warehouse at Main and Chestnut streets, St. Louis. Mr. Reed was the president of the Southern Hardware & Supply Co., which was purchased recently by Geller, Ward & Hasner Hardware Co. T. W. Melan is vice-president, and T. B. Fitzwilliam, secretary of the company, which will have a capital stock of \$50,000.

Effects of modern sales and advertising methods upon stabilization is the subject of a meeting to be held at the Auditorium Hotel, Chicago, on March 14, by the Society of Industrial Engineers, George C. Deat, 327 South La Salle Street, Chicago, manager.

The Lebanon Drop Forge Co., Lebanon, Pa., has taken over the Rivetless Chain & Engineering Co., with local plant, and will merge the organization under its present name. The consolidated company will operate with a capital of \$165,000.

Philadelphia

PHILADELPHIA, Feb. 21.

More replenishment buying of steel products has marked the past week's business in this market and has created a somewhat more hopeful feeling among steel companies. Steel bars, spring steel and galvanized wire have been the principal beneficiaries of improved buying and the demand has come both from jobbers and from manufacturing consumers. Detroit automobile manufacturers have furnished a goodly share of the business. In a minor degree, there has also been better buying of plates and structural shapes. Some plate consumers who have not been buyers in many months have placed orders within the past week. A better demand for light rails is also a feature.

Pig iron buying is not large, but there is a better volume of inquiry. Most of the wants are immediate, there being little or no indication at the moment of interest in speculative buying by foundries. In steel-making iron, there is practically no interest.

Prices continue weak with the trend downward whenever changes occur. Eastern blast furnaces are conceding something from their f.o.b. furnace prices when necessary to meet competitive delivered prices, or in other words they are absorbing a part of the freight rate. In steel products the principal change is in wire products, which are now quoted quite generally at \$2 below the recent levels, wire nails selling at \$2.10 per 100 lb. keg, Pittsburgh, plain wire at \$2.15 and galvanized wire at \$3.05. Bars, plates and shapes continue at 1.40c., Pittsburgh, but shading of this price on plates is reported. Sheets remain firm despite weakness of other steel products. Light rails are selling at 1.40c. per lb., Pittsburgh. A recent large sale of structural rivets was made at about 2c., Pittsburgh, which is \$5 a ton below recent so-called regular quotations.

Pig Iron.—There is comparatively little buying of iron, but prospects are somewhat brighter due to a greater number of inquiries received in the past few days. Most of these inquiries are for replenishment only, there being little or no interest among users of foundry iron in speculative buying. The quantities inquired for are small, ranging from a carload to 200 or 300 tons. The only important sales of the week were of gray forge iron, which totaled 3500 or 4000 tons, the buyers being two cast iron pipe companies and a maker of iron plates. Sales were made at prices ranging from \$19 to \$19.50, furnace, but the delivered prices were almost identical at \$20.50. Foundry iron delivered prices are unchanged, but furnaces show a disposition to meet competition by absorbing, when necessary, a part of the freight rate. A New Jersey foundry received several identical bids of \$21.76, delivered, on No. 2X iron, but the f.o.b. furnace prices in one or two instances were close to \$19.50. There is no interest in steelmaking iron.

The following quotations are with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 81 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1 1/2 to 2 1/2 sq. ft.	\$20.84 to \$21.26
East. Pa. No. 2X, 2 1/2 to 2 1/2 sq. ft.	21.34 to 21.76
Virginia No. 2 plain, 1 1/2 to 2 1/2 sq. ft.	21.24 to 21.74
Virginia No. 2X, 2 1/2 to 2 1/2 sq. ft.	21.74 to 22.24
Basic delivery eastern Pa.	19.81
Gray forge	20.50 to 21.50
Malleable	22.50 to 24.00
Standard low phosph. (f.o.b. furnace)	30.00
Copper bearing low phosph. (f.o.b. furnace)	28.00

Ferroalloys.—The advance to \$62.50, Atlantic seaboard, on both British and domestic ferromanganese has checked buying. Practically no business has been closed since the price was advanced, several buyers having covered at the former price just previous to the rise. There is very little demand for spiegeleisen, which is nominally quoted at \$30 for the lower grade, 16 to 19 per cent. The higher grade, 20 to 22 per cent, is scarce.

Billets.—On the small tonnages of rerolling billets which make up the bulk of current business, the usual price is \$28, Pittsburgh, but this could be shaded on larger tonnages. Forging billets have been sold within the week at \$32, Pittsburgh. There are reports of recent substantial sales of rerolling billets for shipment to England.

Plates.—An Eastern plate mill reports that its bookings of orders in the past week constitute the largest week's business in many months. Some consumers who have not been in the market in a long time placed fairly good orders, mostly for boiler steel. On the whole, however, the demand for plates leaves much to be desired. Prices are weak, and there are reports that 1.40c., Pittsburgh, has been shaded on desirable tonnages. Most any order from a carload upward can easily be placed at 1.40c., and only the less-than-carload lots fetch as high as 1.50c. An Eastern fabricator bidding on the proposed Castleton bridge of the New York Central Railroad is inquiring for 10,000 to 12,000 tons of plates, half sheared and half universal. Deliveries are wanted over a three months' period. This is the largest inquiry before the trade, most of the inquiry and buying involving lots of 500 tons and less. The Philadelphia & Reading Railroad last week distributed orders for 800 tons of tank steel for car repairs among three or four mills.

Structural Material.—A better run of small orders is reported by some of the Eastern mills. Building activity in Philadelphia is not extensive, though many rather indefinite projects are talked of. Fabricators have no difficulty in getting protection at 1.40c., Pittsburgh.

Bars.—In steel bars there has been a marked betterment. Orders have come in freely within the past week or 10 days from jobbers and manufacturers. The Detroit district has furnished considerable business. Spring steel as well as soft steel bars has been ordered. The bar mills of the Cambria plant at Johnstown, Pa., are running close to 90 per cent of capacity, although the plant as a whole is not exceeding a 45 per cent operation. Steel bars are being sold freely at 1.40c., Pittsburgh. In bar iron the same price obtains, with the possible exception that it might be difficult to buy large flats and rounds at less than 1.45c.

Sheets.—Prices on sheets continue firm, being the exception among steel products. There is, however, little inquiry in this district to test the market. Blue annealed is quoted at 2.25c., black at 3c. and galvanized at 4c., Pittsburgh.

Wire Products.—Practically all makers of wire products have now reduced prices \$2 a ton as a result of the cutting which has been going on for some weeks. Wire nails are quoted at \$2.40, plain wire at \$2.15 and galvanized wire at \$3.05, all per 100 lb., Pittsburgh. A fairly good demand is reported, particularly for galvanized wire.

Light Rails.—The demand for light rails has improved, but prices are weak. Sales have been made as low as 1.40c. per lb., Pittsburgh, though some mills are asking 1.45c. and 1.50c.

Rivets.—A recent large purchase of structural rivets, approximately 500 tons, was consummated at a price about 2c. per lb., Pittsburgh, which is \$5 a ton below so-called regular quotations.

Old Material.—There was a little better buying of scrap in the past week, but tonnages wanted were small. Prices are unchanged. For delivery at consumers' works in this district we quote:

No. 1 heavy melting steel	\$12.00 to \$12.50
Scrap rail	12.00 to 12.50
Steel rails, retolling	15.00 to 15.50
No. 1 low phosph., heavy 0.04 and under	18.00 to 19.00
Cast iron car wheels	15.00 to 15.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 bushelling	11.00 to 12.00
No. 2 bushelling	9.00 to 10.00
Turnings (short shoveling grade for blast furnace use)	9.50 to 10.00
Mixed borings and turnings (for blast furnace use)	9.50 to 10.00
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.00
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	12.50 to 13.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	17.00 to 18.50

Warehouse Business.—Moderate improvement in buying of steel out of stock continues. Prices locally on plates and shapes are lower. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.50c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, $\frac{1}{4}$ -in. and heavier, 2.50c.; tank steel plates, $\frac{3}{16}$ -in., 2.55c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.50c.; diamond pattern plates, $\frac{1}{4}$ -in., 4.60c.; $\frac{3}{16}$ -in., 4.75c.; $\frac{1}{2}$ -in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.25c.; steel bands, No. 12 gage to $\frac{3}{16}$ -in., inclusive, 3.10c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Boston

BOSTON, Feb. 21.

Pig Iron.—Business in pig iron suffered a relapse this week, orders booked consisting of a carlot here and there, the aggregate tonnage involved being unimportant. The Gurney Heater Co., Framingham, Mass., inquiring on 2000 tons of No. 2 X, has withdrawn, temporarily, from the market. The largest prospective inquiry is for 500 tons, silicon 2.75 to 3.25, to be put out within the immediate future by a maker of textile machinery. In the absence of business, Buffalo irons appear firmer. One furnace heretofore offering silicon up to and including 3.25 at \$18, furnace, this week is quoting \$19 on small tonnages and \$18.50 on large. Other furnaces quote \$18.50, which suggests a recovery of at least 50c. Eastern Pennsylvania furnace interests are meeting \$19, Buffalo delivered, iron. The market on such irons therefore cannot be considered firmer. Some Virginia and Alabama iron is coming into this territory, but hardly enough to constitute a real market.

We quote delivery at common New England points as follows, having added to furnace prices \$1.06 freight from eastern Pennsylvania, \$5.16 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East Penn., sil. 2.25 to 2.75	\$23.06 to \$24.56
East Penn., sil. 1.75 to 2.25	23.06 to 24.06
Buffalo, sil. 2.25 to 2.75	23.96 to 24.46
Buffalo, sil. 1.75 to 2.25	23.96 to 24.46
Virginia, sil. 2.25 to 2.75	29.08 to 30.08
Virginia, sil. 1.75 to 2.25	28.58 to 29.58
Alabama, sil. 2.25 to 2.75	27.16
Alabama, sil. 1.75 to 2.25	26.66

Cast Iron Pipe.—The Metropolitan District Commission, Boston, this week placed the largest single order for cast iron pipe noted in this territory for several months. From the Warren Foundry & Machine Co. it purchased 3150 tons of 20-in., 24-in. and 30-in. pipe, and from the United States Cast Iron Pipe & Foundry Co. 50 tons of fittings for 20-in. and 30-in. pipe, deliveries to begin at once and to terminate on or before May 1. The city of Portland, Me., has placed an order for approximately 1800 tons of 6-in. to 12-in. pipe and 35 tons of fittings with the Warren Foundry & Machine Co., for delivery up to May 1. A large tonnage of additional business is in the making, but prospective buyers are slow in making up lists. Representatives of pipe makers report books well filled with orders. Prices are firm and unchanged, as follows: per net ton, f.o.b. Boston and district, in carload lots, 3-in., \$66.70; 4-in., \$56.70; 6-in., \$50.70; 10-in. and larger, \$49.70, with \$4 differentials on Class A and gas pipe. Bids will be opened March 1, by the city of Boston, on 2150 tons 6 in. to 36 in. pipe, Boston specifications. R. D. Wood & Co. have secured approximately 800 tons of gas pipe from Stone & Webster, Boston.

Warehouse Business.—Further increases in the movement of iron and steel out of warehouses is noted, with the greatest activity in sheets and structural steel. The average order for bars involves small weights, and the increase in the movement out of stock is due entirely to an increase in the number of orders received daily. An improvement in the demand for belts and nuts also is noted, but business is spotty. Local quotations on wire nails have been reduced 15c. to \$3.25 per keg base.

Finished Material.—The New England Structural Co. has been awarded 600 tons of structural steel for the Beacon Press Co., Boston, building, and 200 tons

for an Allston theater, and the American Bridge Co. the steel for a \$100,000 Holyoke, Mass., silk mill. Bids are being taken on 3000 tons for a Park Square, Boston, building, 240 tons for a Manchester, N. H., theater and 138 tons for a Winter Street, Boston, building, as well as on approximately 5000 tons for other projects, negotiations for which are private, all to be awarded presumably within the next fortnight. Mill representatives report business running well ahead of last month on bars, bands, plates, sheets and structural steel for stocking purposes. The Bangor & Aroostook Railroad has bought 2000 tons 80-lb. rails from the Bethlehem Steel Co., and 7400 standard angle joints. The Maine Central Railroad 3000-ton rail inquiry remains open.

Jobbers now quote: Soft steel bars, \$2.55½ per 100 lb. base; flats, \$3.05½; concrete bars, stock lengths, \$2.55½; structural angles and beams, 2 60½; plates, \$2.55½ to \$2.82; tire steel, \$3.85 to \$1.25; open hearth spring steel, \$4.50; crucible spring steel, \$11.50; bands, \$3.15½ to \$3.53; hoop steel, \$3.15½; cold rolled steel, \$3.10 to \$3.90; toe calk steel, \$8; refined iron, \$2.55½ per 100 lb. base; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50.

Coke.—Daily shipments of by-product foundry coke by the New England Coal & Coke Co. and the Providence Gas Co. continue to run well ahead of those for the corresponding period last month. While business is better than it was, the above mentioned companies have not found it necessary to increase oven production. The buying is in anticipation of labor troubles at the coal mines April 1, rather than because of any marked increase of foundry operations. Only an occasional car of Connellsville foundry coke is finding its way into this territory. Prices are reported as firm by both New England producers on a basis of \$10.15, delivered, where the local freight does not exceed \$3.40.

Old Material.—Little of interest developed in the old material market the past week. New England users, as well as Pennsylvania mills, showed the same indifference they did during the previous week. In the absence of business, prices are largely nominal and therefore not subject to change. The demand for borings, the outstanding feature of the market during the latter part of January, appears to have dried up, yet dealers are quoting on the former basis. The low cost of pig iron and the low operating ratio of the average foundry in this territory account in a large measure for the inactivity of machinery cast.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	\$18.00 to \$18.50
No. 2 machinery cast	16.00 to 16.50
Stove plate	15.00
Railroad malleable	12.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$8.00 to \$8.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe (1-in. in diam. over 2 ft. long)	7.00 to 7.25
Machine shop turnings	1.00 to 1.50
Cast iron borings, rolling mill	7.50 to 8.00
Cast iron borings, chemical	8.50 to 9.00
Blas furnace borings and turnings	3.50 to 4.50
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	10.50 to 11.00
Car wheels	11.50 to 12.00
Re-rolling rails	10.00 to 10.50

Bids on the Navy's Copper and Brass Scrap

WASHINGTON, Feb. 20.—Submitting figures ranging from 7.0199c. to 9.3899c. per lb., Herman Jaffe, 220 Broadway, New York, was the highest bidder for 9 out of 11 lots of copper and brass scrap offered for sale by the Navy Department, tenders being opened this morning. The total quantity involved was 1,000,000 lb. The biggest lot included in Mr. Jaffe's bids was 500,000 lb. of reclaimed copper composition scrap ingots at Norfolk, Va., this material containing 81.5 per cent copper, 7.46 per cent tin and 9.51 per cent zinc with minor contents of other non-ferrous material. The price offered for this lot was 8.5699c. per lb. The highest individual bid was 9.76c. per lb., made by the U. T. Hungerford Brass & Copper Co., New York, for 25,000 lb. of brass primer rods at Newport, R. I. Besides the Norfolk and Newport navy yards the material offered for sale is located at the Hingham, Mass., and Portsmouth, N. H., yards. There were nine bidders in all.

Chicago

CHICAGO, Feb. 21.

Railroad purchases of cars and track material during the past month together with recent releases against rail contracts, have had their effect on local mill operations, which now average well over 50 per cent. The Illinois Steel Co. has put in another blast furnace at Joliet, giving it 11 active stacks in all, and is producing steel at the rate of 55 per cent of ingot capacity. The Inland Steel Co. is on a 60 per cent basis, having its entire No. 1 plant in operation and having started three open hearths and its 40-in. blooming mill and 32-in. roughing mill on the No. 2 side.

Much of the business which made these gains in production possible was taken at a sacrifice. This was particularly true of orders taken from car builders and railroads which involved large tonnages. Because of the mills' anxiety to build up a backlog, the advantage was clearly with the buyers and in some instances exceptionally low prices resulted. Recent orders for car steel have gone at 1.40c., Chicago, and even lower, one sale having been made at that price with a freight of 17c. allowed to the point of delivery. Likewise a large railroad order for tie plates was placed at less than \$30, mill. Mills profess to be sick of low-priced business, however, and are showing a firmer attitude on new inquiries. Even at 1.50c., Chicago, it is asserted no profit can be made on plates, shapes and bars. As producers are now fortified with substantial backlogs, it seems probable that the necessity for cutting so far below costs has passed.

Pig Iron.—Buying has been light since the advance in local irons, but such purchases as have been made, ranging from carload lots to 200 tons, have been at \$20 base. Here and there some Southern iron has been sold in this district, but as yet the tonnage has not been large. Although orders have fallen off sharply, some good-sized inquiries are current. The Mt. Vernon Car Mfg. Co. wants 1000 to 2000 tons of malleable for February and March shipment, while a Milwaukee melter is in the market for 2000 tons of Northern and 400 tons of Southern foundry for delivery in the next 60 days. The American Brake Shoe & Foundry Co. is inquiring for 300 tons of foundry for April shipment at the Southern Wheel Co. plant, St. Louis. The Western Electric Co. is negotiating for an additional 300 tons of 3 per cent foundry for March and April shipment. A current local inquiry for 250 tons of low phosphorous is expected to bring out keen competition. Copper free material appears to have firmed up to \$30, Valley furnace, but copper bearing is available at \$2 less. We note several sales of carload lots of charcoal at \$27 base, furnace, and one carload sale at \$28 base. While most producers are now insisting on a minimum of \$28, at least one maker is still offering material at the lower price.

Quotations on Northern foundry, high phosphorous malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil 150, delivered at Chicago, . . .	\$30.50 to \$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil.	
1.75 to 2.25,	20.00
Northern high phos.,	20.00
Southern foundry, sil. 1.75 to 2.25, . . .	21.67
Malleable, not over 2.25 sil.,	20.00
Basic,	20.00
Low phos., Valley furnace, sil. 1 to 2	
per cent copper free,	30.00
Silvery, sil. 8 per cent,	32.82

Ferrolloys.—Spiegelisen has been advanced to \$30, Eastern furnace, or \$40.10 delivered. Furnace stocks are low and consist largely of 16 to 18 per cent material. Several sales of ferromanganese, ranging from one to two carloads, have been made at the new price of \$62.50, seaboard. A local steel works has bought 300 tons of 10 per cent Bessemer ferrosilicon at \$34 delivered.

We quote 78 to 82 per cent ferromanganese, \$70.90, delivered; 50 per cent ferrosilicon, \$56 to \$57.50, delivered; Spiegelisen, 16 to 18 per cent, \$40.10, delivered.

Railroad Equipment.—The Great Northern has ordered 500 refrigerator cars from the General Ameri-

can Car Co. It has deferred action on its box car inquiry and has reduced its gondola inquiry to 250 cars. It is expected to close presently on the gondolas and 500 stock cars.

Bars.—Business in soft steel bars is still expanding, although not sufficiently as yet to stiffen prices, which range from 1.50c. to 1.60c., Chicago, on ordinary orders. The sources of new business are growing more diversified from day to day, although large individual tonnages continue to be placed mainly for car construction and for reinforcing purposes. The Kansas City Bolt & Nut Co. will furnish 1100 tons of reinforcing for a building to be erected for the Kansas City Warehouse & Cold Storage Co. The Concrete Steel Co. has the contract for 800 tons for the Phoenix Knitting Co. plant, Milwaukee. The reinforcing for the Putnam Department Store, Davenport, Iowa, amounting to 135 tons, has been let to the Corrugated Bar Co. The Milwaukee Sewerage Commission has not yet made a formal award of the 5000 tons for the Jones Island disposal plant. Reinforcing jobs pending include 300 tons for the Churchill Hotel, Chicago, 300 tons for the Popular Mechanics Building, Chicago, and 120 tons for state highway work in Bureau County, Ill.

Bar iron demand is light and prices are weak at from 1.55c. to 1.60c., Chicago.

Mill prices are: Mild steel bars, 1.50c. to 1.60c., Chicago; common bar iron, 1.50c. to 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.53c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Hoops and bands, 3.13c.

Sheets.—Domestic demand is slow to improve, but local mills have export business to fall back upon to fill up holes in their rolling schedules. Prices are fairly firm. The local independent is running at capacity with over a month's work ahead.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 3.38c.; No. 28 black, 1.15c.; No. 28 galvanized, 5.15c.

Wire Products.—Buying is of unsatisfactory volume for this time of the year and prices are unsteady. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 559.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.13 per 100 lb.; No. 9 and heavier bright basic wire, \$3.28 per 100 lb.; common wire nails, \$3.25 per 100 lb.; cement coated nails, \$2.65 per keg.

Steel Castings.—The castings for the Burlington cars have not yet been let. Owing to the substitution of rolled steel construction for some car parts ordinarily supplied by the steel foundries, the tonnage of castings to be bought will not be so large as was expected. The castings market is generally quiet, although the prospect of further car lettings is encouraging. Figures submitted on a number of recent inquiries indicate a tendency toward firmness and a rather general adherence to prices which approximate those published on pages 348 to 350 of THE IRON AGE of Feb. 2, although the manner of quoting was in some cases different.

Plates.—Demand continues to broaden with orders coming from widely distributed sources. While the individual tonnages are generally small, their increasing number is regarded as an indication of growing confidence in the present market level as well as a gradual improvement in general industrial activity. While prices are still soft, ranging from 1.50c. to 1.60c., Chicago, on the general run of business, the tendency is toward greater firmness on the part of sellers. Further railroad car business has been let with more in sight, but little new work of consequence is being undertaken by the oil industry. The only recent oil tank job placed was a small one, consisting of 10 station tanks, involving 400 tons, to be fabricated and erected in this city for the Standard Oil Co. by the Graver Corporation.

The ruling mill quotations range from 1.50c. to 1.60c., Chicago. Jobbers quote 2.63c. for plates out of stock.

Rails and Track Supplies.—Track supplies are in active demand and specifications against rails on contract are heavier. The New York Central has placed 12,000 kegs of spikes, as well as some bolts and angle bars with the Illinois Steel Co. The Big Four is in the market for 6000 tons of tie plates. Recent inquiries for tie plates have brought out keen competition, the going market price of \$35 per net ton having been shaded in one or two instances. New rail orders reported include 3000 tons bought by the Hocking Valley from the Lackawanna Steel Co. and 2500 tons placed with the Gary mill by the Monon. The latter road has also released 2000 tons on contract. Altogether releases received by the Gary mill during the week totaled 20,000 tons, including 8000 tons for the Great Northern and substantial tonnages for the Baltimore & Ohio and the Missouri Pacific. The demand for light rails is light and prices range from 1.50c. to 1.60c., mill.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.50c. to 1.60c., f.o.b. makers' mills. Standard railroad spikes, 2.10c., Pittsburgh; track bolts with square nuts, 3.10c., Pittsburgh; tie plates, steel and iron, 1.75c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—Both jobbers and consumers are buying a little more freely, but bookings are still exceedingly unsatisfactory and discounts remain very weak.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 to 10 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off, blank nuts, \$4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—There are few new lettings to report and while much fabricating work is in the formative stage, it is slow in getting to the bid-taking stage. Prices on plain material are still weak and the general market appears to range from 1.50c. to 1.60c., Chicago. Fabricating awards include:

Sun Drug Co. Building, Los Angeles, 600 tons, to Llewellyn Iron Works. Michigan State Highway Department, one 150-ft. through truss span near Rockland, Mich., 112 tons, to unnamed fabricators. Repairs to south approach Missouri River Bridge, Sioux City, Iowa, 200 tons, to American Bridge Co.

Pending business includes:

Northern Pacific Railway, miscellaneous spans for distribution over entire system, 1922 requirements, 2900 tons.

Central Y. M. C. A. building, Columbus, Ohio, 500 tons, bids in.

London Guarantee Life Assurance Building, Chicago, 4400 tons, general contractor's bids in.

Shrine Auditorium, Indianapolis, 350 tons.

Wisconsin Highway Commission bridge, Tomahawk, Wis., 278 tons, Stein Construction Co., Milwaukee, general contractor.

Jones Island Sewage Disposal Plant, Milwaukee, 450 tons, bids to be opened by John H. Fowles, City Hall, March 10.

The mill quotation on plain material ranges from 1.50c. to 1.60c., Chicago. Jobbers quote 2.63c. for plain material out of warehouse.

Cast-Iron Pipe.—The People's Gas Co., Chicago, has placed 9000 tons of gas pipe with the United States Cast Iron Pipe & Foundry Co., and the Milwaukee Gas Co. has awarded 500 tons to the Lynchburg Foundry Co. Other lettings include:

Brook Park, Ohio, 600 tons of water pipe to the National Cast Iron Pipe Co. Fairfax, Okla., 175 tons, to National Cast Iron Pipe Co. Muscatine, Iowa, 650 tons, to United States Cast Iron Pipe & Foundry Co. Detroit Fire Commissioners, 300 tons of high pressure pipe, to United States Cast Iron Pipe & Foundry Co. Minneapolis, 800 tons, to American Cast Iron Pipe Co.

Pending business includes:

Grove City, Ohio, 350 tons, bids in Feb. 28, contractor's job. Wausau, Wis., 200 tons, Feb. 18. Madison, Wis., 150 tons, Feb. 18. Moulton, Iowa, 300 tons, Feb. 23. Stratton, Col., 200 tons, Feb. 23. Cody, Wyo., 325 tons, Feb. 24. Muskegon, Mich., 150 tons, Feb. 24.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$45.60 to \$46.60; 6-in. and above, \$41.60 to \$42.60; class A and gas pipe, \$3 extra.

Old Material.—Consumptive buying has improved,

although it cannot be said that a real buying movement is under way. A number of important local melters have made fair purchases of cast and malleable, however, and an iron mill has closed for about 1500 tons of No. 1 busheling. It is also evident that there have been substantial purchases of open-hearth grades. According to an unauthenticated report, the Gary works has placed orders for 10,000 tons, while it is also said that several thousand tons have been bought by another steel mill. On the whole, prices show greater firmness and a number of grades have advanced. That dealers anticipate a rising market is indicated by the fact that they are paying higher prices for railroad material than are quoted below.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Relaying rails	20.00 to 25.00
Cast iron car wheels	15.00 to 15.50
Rolled or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	12.75 to 12.25
Heavy melting steel	11.50 to 11.00
Frogs switches and guards cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50
Low phos., heavy melting steel	13.50 to 14.00
Drop large flashings	7.50 to 8.00
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	8.50 to 9.00

Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.75 to 11.25
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	12.50 to 13.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
Cut forge	10.00 to 10.50
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	12.50 to 13.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.00 to 11.50
Locomotive tires smooth	10.00 to 10.50
Machine shop turnings	4.50 to 5.00
Cast borings	6.25 to 6.75
Slove plate	12.50 to 13.00
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Cincinnati

CINCINNATI, Feb. 21.

Pig Iron.—Some fair sized sales of pig iron were reported during the week, but in the majority of cases carload orders were the rule. There are evidences however, that the melt of iron is increasing slightly, and buyers are more receptive to advances by the sellers. The inquiry from some districts is still light and prices are inclined to be rather unsteady. Reports are current that Southern iron has been sold at \$15, Birmingham base, and in this connection it is said that a Kentucky sanitary company has placed 1500 tons for prompt shipment at this figure. The general market, however, in the South remains quotable at \$15.50, but a desirable tonnage no doubt could be placed at lower prices. Sales are about evenly divided between Northern and Southern. Of the former, a Portsmouth stove maker took 300 tons, and a Mansfield melter 100. An Indiana manufacturer bought 400 at a price said to be \$18, Lake furnace. Several 100-ton sales of Northern furnaces also are reported. A Louisville melter bought 500 tons of Southern at \$15.50 base, and an Indiana melter 100 tons at the same figure. A Cleveland district melter took 400 tons of silvery iron at the schedule. Outside the district a Michigan melter bought 5000 tons of foundry iron, and a St. Louis district foundry 200 tons of low phosphorus. Prices in the North are ruling about the same as last week, although a firmer tone is noted in Chicago and Cleveland iron.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$20.00 to \$20.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	20.50 to 21.00
Ohio silvery, 8 per cent sil.	20.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	21.52 to 22.02
Basic, Northern	21.02
Malleable	22.02 to 22.52

Finished Material.—If one is to judge from reports, the aggregate tonnage placed during the week was perhaps the best for any similar period since Jan. 1. The orders, however, are still confined to carload lots, although occasionally up to 100 tons are desired. The largest inquiry reported is for 450 tons of bars for the L. & N. Railroad. There is no particular branch of the trade that is especially active and orders placed cover bars, shapes, plates and wire products. The sheet market has slowed up a little during the past two weeks, but several 100-ton orders were reported during the past week. Practically all orders placed are for immediate shipment and there is desire apparent on the part of buyers to contract for the future. Prices as a rule are holding at last week's levels, although it is said on wire fencing and wire nails, considerable shading is being done. Reports were current that one manufacturer of wire fencing was quoting 71 per cent off the list and that wire nails are available under the regular price of \$2.40 per keg. On bars, shapes and plates, the usual quotation is 1.40c., and on sheets 3c. and 4c. for black and galvanized, respectively. Several weeks ago it was reported that galvanized sheets could be had at 3.75c., but this price apparently has disappeared, as all the orders now being placed are at the full schedule. There was little activity in the structural field during the week, the only award of consequence being 250 tons for the Capital Hotel at Frankfort to the Dayton Structural Steel Co., Dayton, Ohio. The American Car & Foundry Co. is taking bids on an addition to its plant at Huntington, W. Va., involving 500 tons. Frank L. Packard, Columbus, Ohio, will shortly call for bids on a twelve-story office building at Canton, Ohio, and a twelve-story bank building at Ironton, Ohio. The same firm will, early in April, send out plans for the North High School at Columbus, which will take a considerable tonnage of steel. Bids will close on Feb. 28 for the Wilde Bank Building at Indianapolis, involving 500 tons, on March 1 for the Indianapolis Athletic Club, involving 1200 tons, and on the same date for the Business Men's Club in Cincinnati, involving 500 tons. Pending projects include two school buildings at Middletown, Ohio, bids for which will close on Feb. 23, and a high school at Greenville, Ohio, which will come up during April. The new Hotel William at Columbus, Ohio, will not likely be up for bids before late spring, and plans are now being completed for the new hotel to replace the old Neil House in the same city. This building will be of sixteen stories and will also contain a theatre. The Big Four Railroad is inquiring for approximately 100,000 tie-plates and 3200 kegs of track bolts, bids for which will close on Feb. 27.

Old Material.—Local dealers report several tentative inquiries from steel companies, and also from jobbing foundries, but actual sales are few. It is expected, however, that some activity will be shown during the next week or two. Prices are soft, but unchanged.

We quote dealers' buying prices, f.o.b. cars.

Per Gross Ton		
Bundled sheets	33.50 to	\$4.00
Iron rail	11.50 to	12.00
Revolving rails, 50 lb. and up.	94.50 to	25.00
Revolving steel rails	10.00 to	10.50
Heavy melting steel	8.50 to	9.00
Steel rails for melting	8.50 to	9.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.00 to	8.50
Cast borings	2.00 to	3.50
Steel turnings	2.00 to	2.50
Railroad cast	11.50 to	12.00
No. 1 machinery	13.00 to	13.50
Burnt scrap	7.00 to	7.50
Iron axes	15.00 to	15.50
Locomotive tires (smooth inside)	9.00 to	9.50
Pipes and flues	3.50 to	4.00

Coke.—The coke market is showing considerable activity, the threatened coal strike being responsible in large part. Prices are stiffening somewhat, and Connellsville foundry coke is now quoted at \$4 to \$4.50. Wise County foundry at \$5 to \$5.50, and New River foundry at \$7.50 to \$8.

Warehouse Business.—Local jobbers report a fair week with particularly good orders for concrete reinforcing bars. While the tonnages are not heavy, the number of orders is increasing and on the whole con-

ditions show some improvement. Some weakness has developed in the wire and nail market and it would not be surprising if lower prices were heard in the near future.

Iron and steel bars, 2.75c. base; hoops and bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold rolled rounds, 1½ in. and larger, 3.50c. base; under 1½ in. and flats, squares and hexagons, 4c.; No. 10 hot annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 6.25c.; wire nails, \$2.95 per keg base; No. 9 annealed wire, \$2.85 per 100 lb.

Proposed Merger for Japanese Iron Furnaces

"The proposal for a merger, which was recently started and at once dropped, is revived by Japanese furnaces, whose position, it is feared, becomes more helpless when the proposed naval holiday is effective," states the *Japan Advertiser* of Dec. 24. Views regarding the merger are again being exchanged among furnace managers, although it is thought that much time will elapse before the proposal materializes.

During the early months of 1921 the industry was confronted with its worst crisis, and at one time during the summer it was proposed by some ironmasters to render easier the position of the industry through the merger of all mills. This proposal was at once dropped because of some difficulties that were foreseen.

Buying, however, has been improving, which, coupled with the limited production at home and restricted importation from abroad, has served to lighten the burden of the market and industry. According to a stock report of Nov. 11, 1921, the total of the pig-iron stock in Japan was up to 255,990 tons. It is now believed to have fallen to approximately 250,000 tons.

Merger Proposal Revived

The proposal for a merger of the iron furnaces has again been revived, evidently because of the proposed naval holiday and its effect on the industry and also because of the uncertainty regarding the general revival of business. A short time ago representatives of several leading furnaces held a conference in the Industrial Club of Japan to discuss their present difficulty. As a result, the conclusion was reached that the only way open to them is to combine and readjust all Japanese furnaces.

It is stated in a report emanating from reliable quarters that managers of furnaces have begun the study of all problems pertaining to the maturing of their proposal, such as the warlike consumption of iron in Japan, the consumption of iron for commercial and industrial purposes, imports and exports, the cost of production at the different mills, etc.

Improved Situation in Spanish Iron Mines

Commercial Attaché Charles H. Cunningham, Madrid, says the situation in the mines of Bilbao is slightly improved, due to the increased demand for mineral ore in England. It is stated that orders have recently been received for about 115,000 tons of various classes of iron ore. This does not mean, however, a relief from the difficult situation which has prevailed in Bilbao during the past year, and where there are at present approximately 2,000,000 tons of red earth piled up without demand.

A voluntary petition in bankruptcy was filed Feb. 9 by the Racine Auto Tire Co., Racine, Wis. Schedules admit liabilities of \$1,453,216 and claim assets of \$1,642,836, which does not include the going or replacement value. Unsecured claims amount to \$972,675, and secured claims \$116,332. The largest secured creditor is the J. I. Case Threshing Machine Co., Racine, with a claim of \$90,000, secured by a land contract. The largest items of the assets is machinery, which is listed as having a value of \$402,185.

The referee in bankruptcy at Milwaukee has designated March 1 as the date when the entire assets of the defunct John Obenberger Forge Co. of West Allis, suburb of Milwaukee, are to be offered for sale at public auction. The sale will be held in room 502 of the Federal Building at Milwaukee, under the direction of J. F. Gerdis, trustee in bankruptcy.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic..\$0.36	Kansas City	\$0.81
Philadelphia, export... 0.265	Kansas City (pipe)...	0.77
Baltimore, domestic... 0.35	St. Paul	0.665
Baltimore, export... 0.255	Omaha	0.815
New York, domestic... 0.38	Omaha (pipe).....	0.77
New York, export... 0.285	Denver	1.35
Boston, domestic... 0.405	Denver (wire products) 1.415	
Boston, export... 0.285	Pacific Coast	1.665
Buffalo	Pacific Coast, ship plates 1.355	
Cleveland	Birmingham	0.765
Detroit	Jacksonville, all rail.. 0.555	
Cincinnati	Jacksonville, rail and	
Indianapolis	water	0.46
Chicago	New Orleans	0.515
St. Louis		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 30,000 lb., and there is an extra charge of 5c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 56c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1; wire fencing, netting and stretch, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 25c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zeos, structural sizes, 1.40c. to 1.50c.
Sheared plates, 1/4 in. and heavier, tank quality, 1.40c. to 1.50c.

Wire Products

Wire nails, \$2.10 to \$2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.15 to \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.15 to \$2.25; galvanized wire, \$2.65 to \$2.75; galvanized barbed wire, \$3.00 to \$3.15; galvanized fence staples, \$3.00 to \$3.15; painted barbed wire \$2.55 to \$2.65; polished fence staples, \$2.25 to \$2.65; cement-coated nails, per count keg, \$1.90 to \$2.00; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are 10 1/2 per cent off list for carload lots, 6 1/2 per cent for 1000-foot lots, and 6 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 10 per cent off list.
Machine bolts, small, cut threads, 70 and 10 per cent off list.
Machine bolts, larger and longer, 70 and 10 per cent off list.
Carriage bolts, 3/4 in. x 6 in., 70 per cent off list.
Smaller and shorter rolled threads 70 and 10 per cent off list.
Cut threads, 70 per cent off list.
Longer and larger sizes, 70 per cent off list.
Lag bolts, 70, 10 and 5 per cent off list.
Plow bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list.
Other style heads, 20 per cent extra.
Machine bolts, c.p.c. and t. nuts, 3/4 in. x 4 in., 65, 10 and 5 per cent off list.
Smaller and shorter, 65, 10 and 5 per cent off list.
Larger and longer sizes, 65 and 10 per cent off list.
Hot pressed sq. or hex. blank nuts, \$5.50 off list.
Hot pressed nuts, tapped, \$5.25 off list.
C.p.c. and t. sq. or hex. blank nuts, \$5.25 off list.
C.p.c. and t. sq. or hex. blank nuts, tapped, \$5.00 off list.
Semi finished hex. nuts:
1/4 in. to 9/16 in. inclusive, 80, 10 and 10 per cent off list.
Small sizes S. A. E., 80, 10, 10 and 10 per cent off list.
% in. to 1 in. inclusive, S. S. and S. A. E., 70, 10, 10 and 10 per cent off list.
Stove bolts in packages, 80 and 3 tens and 5 per cent off list.
Stove bolts in bulk, 80, 3 tens and 2 1/2 per cent off list.
Tire bolts, 70, 10 and 5 per cent off list.
Track bolts, carloads, 3c. to 3.25c. base.
Track bolts, less than carloads, 4c. to 4.25c.

Upset and Hex. Head Cap Screws

1/4 in. and under, 80 and 10 to 80, 10 and 10 per cent off list.
9/16 in. to 3/4 in., 80 and 10 to 80, 10 and 10 per cent off list.

Upset Set Screws

1/4 in. and under, 80, 10 and 5 to 85 per cent off list.
9/16 in. to 3/4 in., 80, 10 and 5 to 85 per cent off list.

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 to 80 per cent off list.

Milled Set Screws

All sizes, 70, 10 and 10 per cent off list.

Rivets

Large structural and ship rivets, \$2.10.
Large boiler rivets, 2.20.
Small rivets, .75 and 10 off list.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$35 to \$36; chain rods, \$35 to \$36; screw stock rods, \$40 to \$41; rivet and bolt rods and other rods of that character, \$35 to \$36; high carbon rods, \$42 to \$46, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 5/16 in. and larger, \$2.15 to \$2.20 base per 100 lb. in lots of 200 lbs. of 200 lb. each or more; spikes, 1/2 in., 3/4 in. and 7/16 in., \$2.25 to \$2.30 base; 5/16 in., \$2.25 to \$2.30 base. Bolt and large spikes, \$2.25 to \$2.30 base per 100 lb. in carload lots of 200 lbs. or more, f.o.b. Pittsburgh. Track bolts, 2c. to 3.25c. base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$3.10 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.10 per package; 8-lb. coating, 1 c., \$9.60; 15-lb. coating, 1 c., \$11.80; 20-lb. coating, 1 c., \$13; 25-lb. coating, 1 c., \$14.25; 50-lb. coating, 1 c., \$15.25; 35-lb. coating, 1 c., \$16.35; 10-lb. coating, 1 c., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.40c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh listing card.

Sheet		Ball Weld		Iron	
Inches	Black	Galv.	Inches	Black	Galv.
1 1/4	54 1/2	54 1/2	1 1/4 to 1 1/2	54 1/2	22 1/2
1 1/2	60	59 1/2	1 1/2 to 1 3/4	59 1/2	18 1/2
1 3/4	65	64 1/2	1 3/4 to 2	64 1/2	27 1/2
2	69	68 1/2	2 to 2 1/2	68 1/2	29 1/2
2 1/2	71	70 1/2			
Lap Weld					
2	64	54 1/2	2 1/2 to 3	39 1/2	25 1/2
2 1/2	68	55 1/2	3 to 3 1/2	42 1/2	29 1/2
3	65	54 1/2	3 1/2 to 4	40 1/2	27 1/2
3 1/2	64	50 1/2			
Ball Weld extra strong, plain ends					
1 1/4	50 1/2	33	1 1/4 to 1 1/2	41 1/2	37 1/2
1 1/2	56	38 1/2	1 1/2 to 1 3/4	37 1/2	23 1/2
1 3/4	62	40 1/2	1 3/4 to 2	42 1/2	28 1/2
2	67	55 1/2	2 to 2 1/2	44 1/2	30 1/2
2 1/2	69	57 1/2			
2 1/2 to 3	70	58 1/2			
Lap Weld, extra strong, plain ends					
2	62	50 1/2	2 1/2 to 3	40 1/2	27 1/2
2 1/2	66	54 1/2	3 to 3 1/2	43 1/2	31 1/2
3	63	53 1/2	3 1/2 to 4	42 1/2	30 1/2
3 1/2	61	47 1/2	4 to 4 1/2	37 1/2	23 1/2
4	60	44 1/2	4 1/2 to 5	30 1/2	18 1/2

PERSONAL

Huntington Downer, who for the past two years has been district sales manager in Philadelphia for the Lackawanna Steel Co., Buffalo, has resigned that position to become manager of the iron and steel department of the Iron Trade Products Co., Pittsburgh.



HUNTINGTON DOWNER

Mr. Downer has had a thorough training in the steel business. After his graduation from Yale University, he entered the operating department of the Lackawanna Steel Co., learning the business from the mining of ore to the production of semi-finished and finished steel. He then entered sales work and was in the general sales department of the company at the time of his appointment to the position in Philadelphia. The Iron Trade Products Co., with which Mr. Downer becomes identified, is engaged on a brokerage basis in the sale of ore, pig iron, alloys, fluorspar and other materials used in the iron and steel trade.

Lewis D. McClaren, for a number of years on the sales force of Rogers, Brown & Co., pig iron brokers at Chicago, has resigned to become sales manager of the coke department of the Wisconsin Lime & Cement Co., Conway Building, Chicago. This company has the Chicago agency for the sale of Roberts by-product coke, manufactured by the St. Louis Coke & Chemical Co., Granite City, Ill. C. E. Trommer, sales representative Rogers, Brown & Co., at St. Louis, has been transferred to Chicago to take the place made vacant by Mr. McClaren.

Lester G. Sigourney has recently been chosen secretary of the New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, etc. He has been with the company for several years.

John D. Ryan, chairman of the board of directors of the Anaconda Copper Co., Cornelius F. Kelley, president of the same company, and Benj. B. Thayer, vice-president of the company, were all elected directors of the American Brass Co., Waterbury, Conn., at the recent meeting of the latter company. They were also chosen on the executive committee of the American Brass Co.

Hollinshead N. Taylor, president N. & G. Taylor Co., manufacturer of tin plate, Philadelphia, who was elected a member of the board of directors of the Philadelphia Chamber of Commerce to succeed James B. Bonner of the Carnegie Steel Co. on the latter's removal to Washington, has been appointed a member of the executive committee of that organization. He is also chairman of the industrial committee and a member of the committees on public utilities and aviation.

C. W. Forcier, 433 Union Arcade Building, has been appointed Pittsburgh district sales representative the Tacony Steel Co., Philadelphia.

Lorenz Maisel has disposed of his interest in the Madison, Wis. Tool & Stamping Works, and retires as treasurer and general manager. Mr. Maisel in November, 1920, resigned as general superintendent Burgess Battery Co., Madison, to take an important interest in the tool works, which he reorganized. He has not made public plans for the future.

C. L. Dewey, who was associated with Carl Akeley in the invention and development of the cement-gun, and who has done extensive cement-gun contract work under the names of the Dewey Cement-Gun Co. and the Traylor-Dewey Contracting Co., Allentown, Pa.,

has joined the forces of the Cement-Gun Construction Co., Chicago. He will devote his time exclusively to the development of cement-gun contract work.

Justus Egbert, director of purchases, American Radiator Co., Buffalo, has resigned, effective March 1, and will be succeeded by L. H. Beyer. In conjunction with Ralph Waldo of Rogers, Brown & Co., and W. J. McClain, Buffalo sales representative of Republic Iron & Steel Co., Mr. Egbert is forming a company to be known as Waldo, Egbert & McClain, Inc., with headquarters at Buffalo, to sell pig iron, coke, steel, various alloys, fire brick, molding sand, etc.

Ritchie Gill, of the International Sales Corporation, Victoria Street, London, S. W., has taken up his quarters at the Gotham Hotel, New York, and is desirous of getting in touch with substantial houses handling ironmongery in the United Kingdom and Europe.

Elliot D. Drury, formerly sales representative Greenfield Tap & Die Corporation, Greenfield, Mass., is now assistant sales manager American Wringer Co., Woonsocket, R. I.

J. T. Brierly, formerly general manager and treasurer Brierly-Lombard Co., Worcester, Mass., mill supplies, was elected president of the Thompson-Copeland Co., that city, lock washers, nuts, etc., at the annual stockholders' meeting last week. E. A. Copeland is vice-president, and Harry C. Thompson treasurer.

Charles C. Boyden, who resigned his position with the Alan Wood Iron & Steel Co., Philadelphia, a few months ago and went on a trip to California, has returned. His present address is Foxbury, Mass.

Paul L. Battey, formerly vice-president of the Arnold Co., Chicago, and for years chief engineer in charge of various industrial enterprises, including the large Willys-Overland establishment at Elizabeth, N. J., has established himself at 123 West Madison Street, Chicago, as consulting engineer for industrial plants.

Decision Favors U. S. Steel Products Co.

WASHINGTON, Feb. 21.—In a tentative opinion handed down to-day, Attorney Examiner Charles F. Gerry recommends that the Interstate Commerce Commission direct the Director General and the railroads involved to waive the collection of demurrage and storage charges assessed against the United States Steel Products Co. on shipments of iron and steel products delivered at Seattle and Tacoma, Wash., for export to the Philippine Islands, Japan and other Far Eastern destinations during the period from July 1, 1918, to Sept. 9, 1919:

It is held in the tentative report that the charges were legally applicable to the shipments, but that the defendants failed, in conformity with tariff provisions, to notify anyone that the shipments had arrived at Seattle or Tacoma or that they were ready to make delivery at such ports of exit and that therefore the charges were illegal. Charges for the detention of the shipments in excess of free time at those ports remain unpaid and delivering carriers have brought actions at law which are pending.

The Steel Products company took the case to the commission and by the tentative report has been upheld in its claims that the charges have been assessed without tariff authority and if found legally applicable are unjust and in violation of the Federal Control Act. Because of this, the Steel Products company has sought waiver of payment.

Steel Corporation Stock Subscriptions

It was announced at the office of the United States Steel Corporation, Monday, that the stock subscriptions to date this year were by 34,432 employees who subscribed 94,258 shares. Last year up to March 1, 81,710 employees subscribed for 255,825 shares, while in 1920, 66,407 employees subscribed for 167,407 shares. The periods of depression and prosperity have thus been reflected in subscriptions.

OBITUARY

JOSEPH E. SCHWAB, brother of Charles M. Schwab, chairman of the Bethlehem Steel Corporation, and himself prominent for many years in the steel industry, died last Friday afternoon at the Hotel Collingwood, New York, where he had made his home for some time past. The cause of death was given as diabetes, from which he had been suffering for nearly a year. Joseph E. Schwab was born at Loretto, Pa., on Feb. 23, 1864. He joined the engineering department of the Carnegie Steel Co. in 1883, two years after Charles M. Schwab became associated with that company. He continued his service in the engineering department until 1894, when he was made manager of the company's Duquesne Works and he remained there until the formation of the United States Steel Corporation, when he came to New York as assistant to Charles M. Schwab, who had become president of the corporation. Two years later Joseph E. Schwab was made president of the American Steel Foundries, but after a few years he retired from all business activities. He leaves a wife and two children, the elder a son, Charles M. Schwab, who was born on his uncle's birthday and named for him, and a daughter, Dorothy; also two brothers and two sisters, Charles M. and Edward H. Schwab, Mrs. David Barry of Johnstown, Pa., and Sister M. Cecilia of Seton Hill College, Greensburg, Pa. The funeral services were held privately at Loretto, Pa., on Monday.

WILLIAM C. SARGENT, for 22 years secretary and also a director of Chain Belt Co., Milwaukee, died suddenly on Feb. 5 as a result of heart failure. He was 73 years of age and had been in ill health for several years. Mr. Sargent, prominent in industrial circles of Milwaukee and St. Paul, had a wide national acquaintanceship. He was born at Troy, N. Y., Feb. 2, 1849. In 1871 he moved West, locating at St. Paul, where he organized the De Cou, Corliss & Sargent Co., manufacturer of sash and doors. He later became affiliated with the St. Paul Harvester Co. and met C. W. Le Valley, who later founded the Chain Belt Co. of Milwaukee. This meeting was the beginning of a long business association, for in 1900 Mr. Sargent went to Milwaukee to become secretary and later a director of the Chain Belt Co. He was also a director of the Federal Malleable Co., West Allis, Wis. His father was one of the founders of the Terre Haute, Alton & St. Louis Railroad.

JAMES M. ATCHESON, 73 years old, agent for the H. C. Frick Coke Co., with offices in the Carnegie Building, Pittsburgh, died Feb. 14, in St. Petersburg, Fla., where he was spending the winter. Mr. Atcheson had been in failing health for almost a year. He was born in Allegheny, Pa., and had been in the employ of the H. C. Frick Coke Co. more than 30 years.

LOUIS FRANCIS PHIPPS, chairman of the board of directors of the American Frog & Switch Co., Hamilton, Ohio, died suddenly at his home in Cincinnati on Feb. 14. Mr. Phipps was 70 years old and had been identified with the Hamilton company for the past 15 years. Before that time he was connected with the old Globe Rolling Mill. He is survived by a widow and six sisters.

WILLIAM R. KINNEAR, founder of the Kinnear Mfg. Co., Columbus, Ohio, died at his home in Indianapolis on Feb. 12, aged 75. Mr. Kinnear established the Kinnear Mfg. Co. 25 years ago, but sold out his interests 15 years ago and since that time has resided in New York and Indianapolis.

SIR GEORGE J. CARTER, managing director of the Birkenhead Works of Cammell, Laird & Co., Ltd., Sheffield and Birkenhead, England, died Feb. 11 at the age of 62.

R. K. DANA, manager York Insulated Wire Works of General Electric Co., New York, died Wednesday, Feb. 1.

Railroad Rate Hearings to Be Concluded This Week

WASHINGTON, Feb. 21.—Hearings in connection with the general rate investigation before the Interstate Commerce Commission will be concluded on Saturday of the present week. They have been under way for almost six weeks and shippers in every line have appeared before the commission and urged substantial reductions in rates as a means looking to the restoration of normal economic conditions. The iron and steel interests were vigorous in their expression of such an attitude. But from the first the railroads have combatted proposed general reductions, claiming that it would result in so depleting their revenues that they would be bankrupted. The contention of shippers has been that the increased traffic arising from lower rates would more than offset the present high rates and bring about larger net returns for the railroads.

It obviously is a question as to what the decision of the commission will be. It is evident, however, that the prevailing opinion of those who have followed the hearings is that the commission, if it makes any reductions, will content itself with lowering rates on raw products, and perhaps order certain readjustments in some lines. They do not think a general reduction is likely in the near future, but will be left to work itself out gradually. For one thing, it is believed by some that coal will be among the products whose rates will be cut. In this connection, significance is attached to the fact that discussion about coal freight rates engaged the attention of the cabinet meeting last Friday. It also is recalled that Secretary of Commerce Hoover urged reductions on raw products including several manufactured lines, among them metals and metal products, but opposed a general reduction in rates and urged an investigation as to the possibility of increasing some class rates.

Southern Iron Now Competitive in Chicago Territory

CHICAGO, Feb. 18.—The recent advance of local pig iron to \$20 base, Chicago, puts the delivered prices on that product above Southern iron at numerous points in Chicago territory. The comparative figures appended below, which were recently sent out in a circular letter to the trade by the local office of the Matthew Addy Co., are figured on a Birmingham base of \$15.50. The difference in favor of the South would be even greater if the base were placed at \$15 at which price, or its equivalent, some iron has been sold in that territory recently. Those Southern producers which are able to take advantage of combination river and rail rates are in even a better position to compete in the Chicago district. The Matthew Addy figures are as follows:

	Chicago	Birmingham
Battle Creek, Mich.	\$23.36	\$22.56
Benton Harbor, Mich.	22.94	22.17
Crown Point, Ind.	22.10	21.90
Dowagiac, Mich.	22.94	22.44
Grand Haven, Mich.	23.36	22.84
Grand Rapids, Mich.	23.36	22.84
Hastings, Mich.	23.36	22.84
Holland, Mich.	23.36	22.84
Kendallville, Ind.	22.94	22.17
Lansing, Mich.	23.50	22.56
LaPorte, Ind.	21.96	22.17
Manistee, Mich.	25.60	24.08
Mishawaka, Ind.	22.94	22.17
Muskegon, Mich.	23.36	22.84
Owosso, Mich.	23.50	23.10
South Bend, Ind.	22.10	22.17

Complaint of Furnace Co. Discussed

BUFFALO, Feb. 21.—Federal Judge John R. Hazel of United States Court has dismissed the complaint of the Buffalo Union Furnace Co. in its suit against the United States Shipping Board to collect payments for the undelivered portion of a tonnage of 1200 tons of pig iron contracted for in 1918. The Shipping Board canceled the contract after the signing of the armistice. Judge Hazel ruled the Board has the right to so cancel. Other actions growing out of similar cancellations have been held pending this decision.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin		Lead		Zinc	
	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis	
Feb. 15.....	13.25	13.00	30 37½	4.70	4.40	4.85	4.50	
16.....	13.25	12.87½	30 50	4.70	4.40	4.85	4.50	
17.....	13.25	12.87½	30 25	4.70	4.40	4.85	4.50	
18.....	13.00	12.75	29 62½	4.70	4.40	4.85	4.50	
20.....	13.00	12.75	29 62½	4.70	4.40	4.85	4.50	

*Refinery quotation

New York

NEW YORK, Feb. 20.

Some of the markets are more active than others, but demand in general is not heavy. The copper market continues to decline on light demand and offerings from dealers. The tin market has been active, but prices have declined. Good business has been done in lead and prices are firm. There has been no improvement in the zinc market except that prices have remained stationary.

Copper.—Consumers are no more interested in purchases of copper now than they have been for the last few weeks, and as a result the market has again declined because of the light demand and because of offerings from dealers and small producers. Electrolytic copper is quoted from 13c. to 13.25c. delivered, or 12.75c. to 13c., refinery, at which levels some business has been done. Most of the large producers will not meet these prices but are comfortably booked, at least for the first quarter. The opinion prevails that the market cannot go much lower because it has probably reached a level at which dealers bought their stocks, but this view may not prove to be true. The Lake copper market is notably lower in sympathy with the electrolytic.

Tin.—The feature of this market has been the sharp break in the London market to-day because of the liquidation on a fairly extended scale of a large Dutch syndicate. It is stated that Banca tin has been offered for shipment from England and Holland at an equivalent of 29c., delivered, New York. As a result of this the spot Straits market to-day is lower at 29.62½c., New York, and the London market is £7 to £8 per ton lower than a week ago, at £144 for spot standard, £146 for future standard and £146 15s. for spot Straits, with sales of 1200 tons of standard tin. Previous to to-day's developments, on Feb. 15, 16 and 17, there were fairly good sales in this market of Straits tin to consumers. On the first of those days about 400 to 500 tons, mostly future shipment, changed hands and on the other two days about 300 tons was sold, mostly to consumers, although dealers were fair purchasers on the last day. Arrivals thus far this month have been 2260 tons, with 7825 tons reported afloat.

Lead.—Very good business is reported to have been done in the last week and several thousand tons were sold to consumers, probably for March delivery, various consuming interests being the buyers. Prices have not changed and the leading interest continues to quote 4.70c., New York and St. Louis, while independents are selling at 4.40c., St. Louis, or 4.70c. to 4.75c., New York and Eastern points.

Zinc.—Fundamental conditions are unchanged and the market is neither active nor weak. Consumers still buy small lots for early delivery to cover immediate light needs and prime Western for February-March delivery is unchanged at 4.50c., St. Louis, or 4.85c., New York, with the market regarded as firm by some sellers and slightly weak by others. Sales below these levels are, however, not heard of and it is significant that this price has been shaded but once in the last four weeks.

Antimony.—The market continues quiet with whole-

sale lots for early delivery quoted at 4.40c., New York, duty paid.

Aluminum.—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 19c. to 19.10c., f.o.b. plant, depending on the quantity, with the same grade offered by importers at 17c. to 18c., New York, duty paid.

Chicago

FEB. 20.—All of the metals are exceedingly quiet and weak, further reductions being recorded in copper and tin. We quote in carload lots: Lake copper, 13.25c.; tin, 31c.; lead, 4.50c.; spelter, 4.55c. to 4.60c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

Low Output of Canadian Iron in December

The production of pig iron in Canada during last December declined to the lowest level for the year, according to a recent issue of the *Monetary Times*. The total pig iron made amounted to only 39,917 long tons, all of which was made in blast furnaces. By kinds of iron produced the December output was: Basic, 30,698 tons; foundry, 2,948 tons; and malleable, 6,271 tons. Ferroalloys to the amount of 846 tons were produced. On Dec. 31 there were only two furnaces in blast, although the Dominion had at least five furnaces active throughout the greater part of the year. The average monthly output of pig iron during the 12 months ending December was 50,000 tons, or less than the average monthly record for any year since 1908. Throughout the entire period, during which a total of 595,000 long tons of pig iron were made, the market was decidedly quiet and the suspension of interest in iron was general.

Production of Steel Ingots and Castings

The output of steel ingots and castings for the months of November and December were, respectively, 75,039 tons and 12,653 tons. Of the December output 41,100 tons consisted of basic open-hearth steel ingots, made by the producers for their own further use in manufacturing. A total of 1,551 tons of direct steel castings was made, of which 1,458 tons were produced for direct sale, comprising 657 tons of basic open-hearth castings, 97 tons Bessemer castings, and 704 tons of steel castings from electric furnaces.

The production of steel ingots and castings during the 12 months ending December, 1921, was 667,484 long tons, as compared with 1,109,000 tons made during 1920. Of the total 1921 production, 645,075 tons were in the form of direct steel ingots, comprising 641,882 tons of basic open-hearth steel, 239 tons acid open-hearth steel, 94 tons Bessemer, and 2,860 tons made in electric furnaces.

At the Detroit meeting of the National Safety Congress during the week of Aug. 28 to Sept. 21 the sessions will be held entirely within the new Cass Technical High School, wherein are self-contained foundries, chemical laboratories, steel heating plants, machine shops and complete power machinery equipment, which will provide facilities for all of the sectional meetings.

The Bureau of Supplies and Accounts, Navy Department, Washington, is taking bids until Feb. 21 for 100, 700 lb. of steel plates and I-beams for use at the local navy yard.

The Purchasing Agent, office of the Board of Commissioners, District of Columbia, Washington, is taking bids until March 2 for 17,000 ft. of wire cable for the electrical department.

FERROMANGANESE SUPPLIES

1921 Output Lowest in Ten Years—Available Supplies—Small Production of Spiegeleisen

The sharp decline in pig iron production in 1921 has been paralleled by that of ferromanganese and spiegeleisen. According to the monthly blast furnace returns of THE IRON AGE, the production of ferromanganese last year was the lowest in 10 years. Still more striking was the fall in the output of spiegeleisen, which reached figures lower than any recorded in many years.

From an average in the first quarter of the year of 19,178 gross tons per month, the ferromanganese production declined to only 3758 tons per month in the fourth quarter. The total for the year was only 98,439 tons or 8203 tons per month or about the same as the production in the 5 years 1910 to 1914 of 8280 tons per month. In 1911 the total was 74,482 tons or 6207 tons per month. In 1918 the output was 345,306 tons or 28,775 tons per month, the high average.

Of spiegeleisen only 56,139 tons was made in 1921 which compares with 65,391 tons in 1919. In 1918 the production was 249,002 tons or nearly four times as much.

The following table gives the output of ferromanganese and spiegeleisen for 1921, compared with previous records:

Ferromanganese and Spiegeleisen Output in the United States in Gross Tons

	Ferromanganese	Spiegeleisen	Total	Average Per Month
First quar., 1921, av. per mo.	19,178	11,667	30,845	...
Second quar., 1921, av. per mo.	8,814	5,814	14,628	...
Third quar., 1921, av. per mo.	2,852	1,338	4,220	...
October, 1921	3,902	...	...	...
November, 1921	3,225	...	...	...
December, 1921	2,811	...	...	...
Fourth quar., 1921, av. per mo.	3,758	...	...	...
Total, 1921	98,439	56,139	154,578	12,881
Total, 1920	382,681	103,178	485,859	40,488
Total, 1919	1,909,799	663,391	2,573,190	214,432
Total, 1918	3,453,306	249,002	3,702,308	308,525
Total, 1917	1,191,125	129,081	1,320,206	110,017
Total, 1916	669,411	1,230	670,641	55,887

For the first time since last July, spiegeleisen was produced in January, this year, and the output of ferromanganese advanced almost 2000 tons over the rate at the end of the year.

Available Supplies

The available supplies of ferromanganese for 1921 and previous years, as obtained from an analysis of the output, imports and exports were as follows:

Ferromanganese Output, Imports and Exports, and Available Supplies, in Gross Tons

	Output	Imports	Exports	Available
Average per month				
1921.....	8,203	755	...	8,958
1920.....	23,557	4,911	288	28,210
1919.....	14,923	2,752	355	17,420
1918.....	28,775	2,264	298	30,741
1917.....	21,486	3,703	*776	25,413
1916.....	17,365	7,517	...	...
1915.....	12,021	4,605	...	...
1914.....	9,958	10,672	...	...
1913.....	6,207	6,688	...	...
5-yr. aver. (1910-14) per month.....	8,280	8,399	...	12,880

*First half only.

Available supplies fell in 1921 to only 8901 tons per month or to the lowest figure in many years. This was intensified by the low rate of imports of only 755 tons per month, a figure probably never reached before. Exports have never been a factor of magnitude but they were only one-fifth in 1921 of what they were in 1920.

Manganese Ore Imports

Manganese ore imports last year, while not the lowest in recent years, were down to 33,446 tons per month as compared with 27,779 tons per month in 1919, the lowest since 1913. In the last quarter of last year these imports had fallen to 20,093 tons per month. Im-

ports for the last quarter of 1921 and for the last few years are given in the following table:

Manganese Ore Imports in Gross Tons

	Total	Average Per Month
October, 1921.....	36,760	...
November, 1921.....	8,620	...
December, 1921.....	14,900	...
Fourth quarter, 1921.....	60,280	20,093
Total, 1921.....	401,351	33,446
Total, 1920.....	606,937	50,578
Total, 1919.....	332,344	27,779
Total, 1918.....	191,303	15,942
Total, 1917.....	629,972	52,498
Total, 1916.....	576,321	48,027
Total, 1915.....	320,784	26,732
Total, 1914.....	315,081	26,257

British Supplies and Manganese Ore

The decline in the imports into Great Britain of manganese ore was much more severe last year than in the case of the American imports. The following table shows these imports for various periods and years:

British Imports of Manganese Ore

	Total	Average Per Month
First half, 1921.....	152,043	23,673
Third quarter, 1921.....	11,559	4,853
October, 1921.....	3,164	...
November, 1921.....	6,174	...
December, 1921.....	6,921	...
Fourth quarter, 1921.....	16,259	5,419
Total, 1921.....	175,856	14,655
Total, 1920.....	1,361,613	113,468
Total, 1919.....	265,800	22,150
Total, 1918.....	267,606	22,301
Total, 1917.....	591,264	49,272
Total, 1916.....	139,509	11,625
Total, 1915.....	577,324	48,110
Total, 1914.....	459,135	38,261
Total, 1913.....	601,177	50,098

These data show that the imports have gradually declined, almost each year since 1913, until for 1921 they are only 14,405 tons per month or about one third of the 1913 receipts. At the end of last year, they had fallen to only 5419 tons per month or about one quarter of the American imports for the same period.

Supplies and Needs in 1921

In the last review of this nature in THE IRON AGE, Nov. 17, 1921, it was estimated that theoretically 147,000 tons of ferromanganese would be needed, if the steel ingot and castings output totalled 21,000,000 tons. Later estimates placed the steel output at 20,000,000 tons, which would require 140,000 tons of ferromanganese. To meet this theoretical need there was 98,439 tons produced and 9059 tons imported which with the exports at 684 tons would leave available 106,811 tons. At the end of last year therefore, there was an apparent deficiency of about 33,000 tons, but heavy supplies carried over from 1920 probably amply cover this apparent deficiency.

More Shipments by River

WHEELING, Feb. 20.—Use of the inland waterways in the shipment of steel products as a means of offsetting the advantage of freight which Middle Western mills now have on business in the South and Southwest, is extending. The Wheeling Steel Products Co., the sales subsidiary of the Wheeling Steel Corporation, last week made a shipment of 1600 tons of steel pipe from the tube works at Benwood, W. Va. This is understood to be the first step toward the establishment of a regular river transportation service by the company. It has been found that water shipments take little, if any, more time than rail freight deliveries and the cost is considerably less.

The Barro Metals Corporation, New York, will commence at once the installation of a new alloy melting department including the installation of four electric melting furnaces. The contract for the complete melting department has been awarded to F. J. Ryan & Co., industrial furnace engineers, Wesley Building, Philadelphia.

BOOK REVIEWS

Hardware Buying Directory. Pages 722, 7 x 10½ in. Published by Hardware Age, 239 West Thirty-ninth Street, New York.

Hardware Buyers Directory is a substantially bound reference book which is designed to acquaint the wholesale and retail hardware dealers with the names, addresses and trade names of manufacturers of products in the hardware and allied lines. The January issue contains about 2500 headings of products under which are listed approximately 35,000 names, addresses and trade names.

Many manufacturers show illustrated and descriptive data of their products, which in connection with the listings enhance the value of the directory as a reference book. Distribution is made quarterly to 40,000 wholesale and retail hardware dealers in the United States, Canada and to foreign countries where English is the commercial language.

Mineral Land Surveying.—By James Underhill, mining engineer, U. S. Mineral Surveyor for Colorado. Pages 237, 5½ by 7¾. Published by John Wiley & Sons, Inc., New York.

This is the third edition, and several additions have been made, especially in the treatment of the direct solar observation. The specimen field notes, to illustrate the requirements of the office of the United States Surveyor General for Colorado, have been entirely rewritten, a different group of claims being used, and they represent the practice at the present time in the survey of mineral lines in the Western portion of the United States.

Mechanical World Year Book for 1922. Reference book; thirty-fifth year of publication. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Size, 4 x 6 in., with 348 pages of text, 267 pages to a buyers' directory and 54 pages for diary and memoranda. Price, 2s. 6d.

Conventional engineers reference book, giving considerable space to power plant equipment, including steam, oil and gas engines, boilers, condensers, turbines and other apparatus. Several pages are devoted to the properties of metals and alloys and also to structural iron and steel work. A comparatively large section is given to toothed gearing and several pages to grinding, screw cutting, indexing on the universal milling machine, limit gages and allied subjects. Space is also devoted to ball and roller bearings, friction and lubrication, hydraulic work, and the heating and evaporating of liquids. A section on pipes and tubes contains a concise collection of data on pipes of cast iron, wrought iron, steel and copper, with many tables of dimensions and details of tees, bends, etc.

The volume includes many useful mathematical and other tables. The subject classifications in the buyers' directory are given in English, French, Spanish and Russian.

The Ship Compendium and Year Book 1922. published by Compendiums, Ltd., 18 Old Compton Street, London, W. 1, England, is a volume of 1008 pages claimed to be the first international reference book on ship construction, equipment, ownership and maintenance. It supplies in 800 sections the names and addresses of 30,000 firms whose interests are germane to ships and shipping. Book is published at £2 9s. 6d., post free for foreign delivery.

New Books Received

Mineral Resources of the United States, 1918. Part I., Metals, G. P. Loughlin, geologist in charge; Part II., Nonmetals, R. W. Stone, geologist in charge. Pages vol. I., 1096; vol. II., 1557. 9 x 5½ in. Published by Government Printing Office, Washington.

Burning Liquid Fuel. By William Newton Best. Pages 341, 9 x 6 in.; illustrations 316. Published by U. P. C. Book Co., 243 West Thirty-ninth Street, New York. Price \$5.

NEW TRADE PUBLICATIONS

Oil Burners.—Denver Fire Clay Co., Denver, Col. A 32-page booklet covering the advantages and operation of oil burners; composition and heating value of various brands of oils, their viscosity, specific gravity and other information, accompanied by tables and charts. The process of oil combustion in the burner is explained and illustrated with drawings. Sectional drawings show oil burners applied to various types of boilers and forges. There is also an illustrated page of refractories manufactured by this company.

Grinding Machines.—Cincinnati Grinder Co., Cincinnati. Booklet illustrating automotive parts grinding machine and power feed and hand feed machines, together with type of work. Illustrations of sections and parts are accompanied by brief descriptions.

Steel Tanks.—Ferguson Allan Co., 504 Bailey Avenue, Buffalo. Bulletin No. 101, dealing with oil and gasoline storage tanks. Line drawings and tables of dimensions, weights and capacities of tanks are included and drawings of compartment truck and wagon tanks and steel dump bodies.

Stokers.—Under-Feed Stoker Co. of America, Book Building, Detroit. Bulletin describing the Jones standard side-dump stoker, a new type. Construction, capacity, automatic air and fuel control and mechanical features are covered with numerous illustrations.

Crawl Tread Crane.—Industrial Works, Bay City, Mich. Catalog No. 113 illustrating type BC crawling tractor crane of 20,000 lb. capacity, designed for road contractors, lumber and coal dealers, foundries and railroad reclamation and storage yards.

Milling on Locomotive Repairs.—Cincinnati Milling Machine Co., Cincinnati. Booklet of 32 pages, compiled to prove to railroad shops the economy of milling their parts. Line drawings show many of the parts which may be milled and there is a listing of 49 parts which come into a railroad repair shop that should be milled.

Industrial Plant Construction.—W. W. Lindsay & Co., Inc., Harrison Building, Philadelphia. Booklet containing views of industrial plants built by the company.

Machine Tools.—Triplex Machine Tool Corporation, 18 East Forty-first Street, New York. Catalog No. 1 describes this company's bench machine, adaptable to turning and boring, angular and vertical milling, thread cutting and drilling.

Waterproofing.—Truseon Laboratories, Detroit. A 32-page booklet dealing with the "Science and Practice of Integral Waterproofing." Specifications are given for waterproofing mass concrete, general masonry by using the cement plaster coat method and waterproofing cement stucco. A section covers the application of the cement plaster coat.

Testing.—Dorr Co., engineer, 101 Park Avenue, New York. Illustrated booklet describing company's plant at Westport, Conn., and methods in handling a test or analysis and the scope of this work are explained.

Fire Alarms.—United States Automatic Fire Alarm Co., Kansas City, Mo. A 32-page booklet of automatic fire alarms illustrating circuit panels, transmitters, circuit breakers, thermostats, punch registers, generators, etc.

The monthly stock list of Joseph T. Ryerson & Son Sixteenth and Rockwell streets, Chicago, has been enlarged from 64 to 128 pages with the January-February issue and will hereafter bear the title "Ryerson Journal and Stock List." Besides the usual stock list the machine tools handled by the company are illustrated and there are several brief articles and news notes.

The Welmore Reamer Co., 62-66 Twenty-seventh Street, Milwaukee, recently consolidated with the Wisconsin Tool & Supply Co., 210 Second Street, has increased its working schedules and force and is now operating at approximately 95 per cent of capacity or orders for reamers, gages, tools, dies and fixtures. New business is developing on a broader scale, especially in the East and in automotive centers, according to E. J. Waltzer, president and general manager.

A reduction of 10 per cent in wages for all employees has been approved by the employees of the Commonwealth Steel Co., Granite City, Ill. The Commonwealth company has been paying more than the union scale. Under the reduction molders will receive 90c. an hour as against the union scale of 75c. an hour, and laborer 85c. an hour, as against the union scale of 80c.

First Sectional Meeting of the American Society for Steel Treating

The first sectional meeting of the American Society for Steel Treating will be held at the Hotel McAlpin, New York, on Friday, March 3. The program is as follows:

- 11:00 a.m. to
1:30 p.m.—Registration.
1:30 p.m.—Address of welcome.
2:00 p.m. to
4:30 p.m.—Technical session. Chairman, George I. Norris, chairman New York Chapter; vice-chairman, Irving H. Cowdrey, chairman Boston Chapter.
- "Cold Headed Bolts—Their Metallography and Heat Treatment" (Illustrated), by V. E. Hillman, metallurgist Crompton & Knowles Loom Works, Worcester, Mass.
- "New Developments on the Influence of Mass in Heat Treatment," by F. J. Janitzky, metallurgist Illinois Steel Co., South Chicago.
- "The Magnetic Testing of Small Case Hardened Chain" (An actual demonstration of the process and results of the testing will be given by the author), by A. V. DeForest, metallurgist American Chain Co. Bridgeport, Conn.
- "Stainless Steel in Cutlery Use" (Illustrated), by R. G. Hall, research engineer R. Wallace & Sons Mfg. Co., Wallingford, Conn.
- "Calite—A New Heat-Resisting Alloy" (Illustrated), by G. R. Brophy, metallurgist research laboratory General Electric Co., Schenectady, N. Y.
- 6:00 p.m. to
7:30 p.m.—Informal dinner, Yates' Restaurant, Forty-third Street, near Broadway.
- 8:00 p.m. to
10:00 p.m.—Technical session. Chairman, A. W. F. Green, chairman Philadelphia Chapter. Presentation of certificate of honorary membership to Dr. John A. Mathews.
- "Perfecting a Drop Forging" (Illustrated), by J. H. G. Williams, assistant works manager Billings & Spencer Co., Hartford, Conn.
- "The Manufacture of Steel" (Illustrated), by B. H. DeLong, metallurgist Carpenter Steel Co., Reading, Pa.

Nearly all of the technical papers in this program have been published in the February *Transactions* of the society and both members and non-members are urgently requested to participate in the discussions. This sectional meeting will serve the membership of 14 of the Eastern and New England chapters of the society and any one, interested in the art of steel treating but not members of the society, is cordially invited to attend.

The second sectional meeting will be held at Pittsburgh in the Bureau of Mines auditorium, May 25 and 26.

The annual exposition and convention of the national organization will be held in the General Motors Building, Detroit, Oct. 2 to 7 instead of in September as originally planned.

Meeting of Electric Steel Founders' Research Group

Officers and operating representatives of the Electric Steel Founders' Research Group held their last regular meeting in Milwaukee on Feb. 6, 7 and 8. This group was formed about two years ago for the systematic prosecution of co-operative technical work which could be directly applied in improving the manufacture of steel castings.

The idea back of this co-operation originated from the realization that the technical experts who are usually found directing the operating departments of steel foundries are prevented by routine work from concentrating on the investigations. These could be prosecuted more effectively if they would engage the exclusive attention of one individual and if he would co-ordinate the technical activities of a few plants whose processes and products place the companies in the same class.

The members of the group are the Electric Steel

Co., Chicago; the Ft. Pitt Steel Casting Co., McKeesport, Pa.; the Lebanon Steel Foundry, Lebanon, Pa.; the Michigan Steel Casting Co., Detroit, and the Sivyver Steel Casting Co., Milwaukee. The group's headquarters are at 639 Diversey Parkway, Chicago, where Major R. A. Bull, research director of the organization, maintains his office.

At the Milwaukee meeting reports were made by the operating heads of plants on comprehensive investigations into important foundry problems that had been delegated by the group to the several companies. It is stated that much progress is being made through these group investigations and that prospects for future accomplishments are most encouraging. The group researches which were reported in detail at the Milwaukee meeting included those on the subjects of annealing, core practice, facing sands, furnace practice and pouring practice.

An inspection was made by all members of the group of the processes employed at the plant of the Sivyver Steel Casting Co.

Roberts Coke Oven Discussed

The Roberts coke oven was the subject of a paper presented at Pittsburgh before the Eastern States Blast Furnace and Coke Oven Association at the William Penn Hotel on the evening of Feb. 16, by M. W. Ditto, consulting engineer of the American Coke & Chemical Co., Chicago. Mr. Ditto covered construction features and also the experience with the use of the coke in the blast furnace of the National Enameling & Stamping Co. at Granite City, Ill. The coke plant comprises 80 Roberts recuperative by-product coke ovens in two batteries built by the St. Louis Coke & Chemical Co., a subsidiary of the American company.

About ninety members and guests were present. A dinner preceded the technical session and seated with President West of the association and with Mr. Ditto was C. A. Meissner, as guest of honor, of the United States Steel Corporation.

The twenty-fifth annual convention of the American Mining Congress will be held in Cleveland, Oct. 9 to 14. The National Exposition of Mines and Mining Equipment, which attracted attention at the annual meeting in Chicago last fall, will again be a feature of this industrial gathering. The exposition will be staged in the Public Hall in Cleveland—a modern convention building recently completed by the city.

COMING MEETINGS

February

American Association of Engineers. Feb. 22. Congress Hotel, Chicago. Secretary, C. E. Drayer, 63 West Adams Street, Chicago.

March

American Society for Steel Treating. March 3. Sectional meeting, Hotel McAlpin, New York. Secretary, W. H. Eisenman, 4609 Prospect Avenue, Cleveland.

Refractories Manufacturers' Association. March 15, 16 and 17. Annual meeting, Chicago. Secretary, E. W. Donahoe.

April

National Metal Trades Association. April 19 and 20. Annual meeting, Hotel Astor, New York. Secretary, Louis W. Fischer, Peoples Gas Building, Chicago.

American Supply and Machinery Manufacturers' Association and Southern Supply & Machinery Dealers' Association. Joint Meeting. April 24 to 26, Birmingham. F. D. Mitchell, 233 Broadway, New York, is secretary of the American association and A. M. Smith, South-Courtney Co., Richmond, Va., is secretary of the Southern association.

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dent, business manager, 327 S. La Salle Street, Chicago.

American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Colin G. Pink, 110 Park Avenue, New York.

Trade Changes

Cots Bros. Mfg. Corporation, maker of the "Simplicity" refillable fuse with general offices at 1425 First National Bank Building, Chicago, has established branch offices during the past month in New York, Philadelphia, Boston, San Francisco, Cleveland, Tampa and Denver.

The Eclipse Stove Co., Mansfield, Ohio, has changed its name to the Tappen Stove Co. The new name was adopted owing to the fact that members of the Tappen family have been permanently identified with the Eclipse Stove Co. during the 10 years that it has been in existence.

The Casey-Hudson Co., Chicago, will remove its business to Chelsea, Mich., occupying the No. 8 plant, power plant and foundry of the Lewis Spring & Axle Co. This property will be purchased from F. H. Lewis.

George W. Cravens, formerly of Westfield, N. J., has been elected president of the Climax Engineering Co., Clinton, Iowa, a subsidiary of the Dulany Trust. G. W. Dulany, Jr., has been president of the Dulany Trust since its organization in 1915 and also chairman of the board of trustees of the trust. The business of the Climax Engineering Co. has grown so as to require the presence of a president who could give more time than Mr. Dulany could give, hence the election of Mr. Cravens. Mr. Dulany was re-elected president of the board of trustees, C. B. Stebbins was re-elected vice-president, Mr. R. D. Upton, re-elected treasurer, and Mr. J. M. Thompson was re-elected secretary. Mr. Cravens, the new president, was for many years with the General Electric Co.

Oliver Machinery Co., Grand Rapids, Mich., has established a new branch office at 716 Lincoln Bank Building, Minneapolis. George C. Ramer, who has had extended experience in the sales department, will be in charge.

McMullen Machinery Co., 64-66 Ionia Avenue, Grand Rapids, Mich., has been appointed exclusive representative by the Diamant Tool & Mfg. Co., Inc., 91-97 Hutton Street, Newark, N. J., in connection with the sale of Diamant standard punch and die sets, in the territory covered by all of the northern peninsula of Michigan and the southern peninsula of Michigan west of the counties of Bay, Saginaw, Shiawassee, Ingham, Jackson and Hillsdale.

The Wyckoff Drawn Steel Co., Brick Building, Pittsburgh, announces the appointment of the recently organized Crane-Schrage Steel Co., with general offices and warehouse at 6189 Greenwood Avenue, Detroit, as its exclusive sales representative and distributor in the Michigan territory.

The Andrews rust proofing process used extensively during the war by the British Government is now available to manufacturers for forming an ebony, rust-proofed finish on ferrous metals. It is claimed that this rust proofing process has stood the Government "salt-spray" test with 100 per cent success. The Surface Combustion Co., Inc., industrial furnace engineer and manufacturer, 366-368 Gerard Avenue, Bronx, New York, has secured the exclusive license for exploiting this process in this country and foreign countries.

The Hesse-Martin Iron Works and the Ersted Machinery Mfg. Co., Portland, Ore., have been consolidated under the name of the Hesse-Ersted Iron Works Co., with \$150,000 capital stock. The merged company will operate at the Hesse-Martin plant, 468 East Taylor Street, which will be enlarged and improved. The incorporators of the new company are Fred Hesse, A. J. Ersted and A. M. Mears.

The Reeves Pulley Co., Columbus, Ind., has appointed the Dodge Sales Engineering Co., Mishawaka, Ind., general sales agent for the "Reeves" variable speed transmission at the Dodge branches in Pittsburgh, Cincinnati, Atlanta, Minneapolis and Chicago.

Effective March 1, the name of the Medart Patent Pulley Co., St. Louis, will be changed to the Medart Co.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has moved its general offices to new quarters in connection with its plant in the Logan Avenue district, Youngstown.

The Argo Iron & Metal Co., Chicago, has moved its scrap iron and metal yards to 1640-52 Elston Avenue, where it is located on a siding of the Chicago & Northwestern Railroad.

The Chicago office of the Matthew Addy Co., pig iron brokers, will be moved from the McCormick Building to 1901 People's Gas Building, effective May 1.

The Max Ann Machine Co., New York, expects to state that it will not open the Rochester office as was stated in a previous announcement.

Plans of New Companies

The Efficient Electrical Display Co., Inc., 26 Court St., Brooklyn, is in the market for factory equipment to increase its output to 100 good sized signs per month. In about five or six weeks, it will be in the market for 15,000 two-piece sign receptacles and also 20,000 ft. of No. 14 rubber covered wire. The only contract awarded thus far has been for the alterations of a building purchased for the manufacture of signs.

Sundh Engineering & Machine Co., Philadelphia, manufacturer of finishing machinery for brass, copper and steel strip mills, has closed its branch office at Eleventh Avenue and Twenty-sixth Street, New York and opened a Philadelphia downtown office in the Otis Bldg., Sixteenth and Sansom Streets.

East Chicago Mfg. Co., East Chicago, Ind., expects to do some of its work by contract and some in its own plant. It is not yet ready to name the material which it will manufacture.

The Detroit Marine-Aero Engine Co., 4196 Bellevue Avenue, Detroit, has completed the construction of a steel and corrugated iron building containing 12,500 square feet.

The Beaver Enamelling Co., Ellwood City, Pa., has taken over the business of the Crichton Curl Enamelling Co. It does not intend to build and is not in the market for equipment.

The Hackney Iron & Steel Co., Enid, Okla., is putting in a stock of reinforcing bars, structural steel and is doing some fabricating. It also has a foundry which is in operation.

G. B. Wickersham, secretary-treasurer of the Muncie Steel Supply Co., has organized G. B. Wickersham & Co., Keenan Building, Pittsburgh, to handle scrap and conduct a general business as auctioneers, appraisers and liquidators. The firm expects to open a yard equipped for economical handling of scrap. Mr. Wickersham retains his interest in the position with the Muncie Steel Supply Co.

Bayonne Steel Products Co. is located at 216-218 Jelliff Avenue, Newark, N. J. This is only temporary quarters, as the company intends to build a fine warehouse in Newark the coming spring or early summer.

L. T. Petersen, former vice-president and general manager of the Republic Rubber Corp., Youngstown, Ohio, is engaged in the organization of a company to manufacture a new type of conveyor belting. The belting has been patented by Mr. Petersen and is claimed to be especially adaptable for use in conveying ore, limestone, coke, metal, grain and other heavy materials.

Schraeder, Gocher & Co. Organized

O. A. R. Schraeder, formerly a partner with J. W. Sanders Co., New York, and Donald Gocher, formerly with sales department of Certain-teed Products Corporation's Philadelphia office, have formed a sales organization as Schraeder, Gocher & Co., 1218 Chestnut Street, Philadelphia, which has assumed the management of the sales department of the Bridesburg Foundry & Engineering Co., Inc., Frankford, Philadelphia, founder of brass, bronze and aluminum castings, both rough and machined.

This company is also selling the product of Atlas Foundry Co., Irvington, N. J., cast-iron welding rods and miscellaneous iron castings. In conjunction with the J. W. Sanders Co., New York, also manufacturers' representative, this company is covering the Philadelphia territory for the Crosby Co., Buffalo, sheet metal stampings; Elliott-Blair Steel Co., New Castle, Pa., manufacturer of fine cold-rolled strip steel, and the Lakeside Forge Co., Erie, Pa., on miscellaneous drop forgings and wrenches.

The Amalgamated Metals Selling Co., Ltd., 41 Broadway, New York, has been appointed sole representative in the United States of the Erftwerke A. G., Grevenbroich, Cologne, Germany. This company is known as the largest and most important producer of virgin aluminum in Germany.

The Interstate Commerce Commission opened a hearing on an application for revised rates on scrap iron and steel at Washington on Feb. 26. The contention is that scrap rates are too high, especially when pig iron rates are used as a standard for comparison.

IRON AND INDUSTRIAL STOCKS

Better Demand for Steel and Equipment Issues During the Past Week

Under the leadership of such issues as United States Steel common and the locomotive shares, there was a better demand and generally higher prices for steel and equipment securities. The buying possibly is based on the greater activity in buying of railroad equipment and in steel mills. Investors in a great many instances, however, are satisfied with developments dealing with the bonus question, and the accompanying higher prices for war bonds. The recovery in sterling exchange is another constructive feature that has encouraged renewed buying of domestic industrial securities. Higher prices quoted for pipe securities reflect better buying of that product.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal. com.. 44 - 45 1/2	Int. Har. pf.... 105 1/2 - 106 1/2
Allis-Chal. pf.... 92 - 93	Lack. Steel..... 46 1/2 - 48 1/2
Am. Can. com.. 37 1/2 - 40 1/2	Marquette Steel... 29 1/2 - 30 3/4
Am. Can. pf.... 96 1/2 - 99	Nat. Acme..... 10 1/2 - 11
Am. C. & P. com. 145 1/2 - 149	Nat. E. & S. com. 49 1/2 - 43 3/4
Am. C. & P. pf. 119 1/2 - 121	N. Y. Air Brake 59 - 59 3/4
Am. Loco. com.. 106 1/2 - 110 3/4	Nova Scotia Steel 24 1/2 - 25
Am. Loco. pf.... 114 1/2 - 116 1/2	Press. Steel com. 63 1/2 - 65 3/4
Am. Rad. com.. 83 1/2 - 85 1/2	Press. Steel pf.. 91 - 92
Am. Std. F. com.. 32 - 32 1/2	Rty. S. Spg. com. 95 1/2 - 98
Am. Std. F. pf.. 98 - 100	Rty. S. Spg. pf.. 113 1/2 - 114 1/2
Bald. Loco. com. 102 1/2 - 106	Replique Steel... 30 1/2 - 31 1/2
Bald. Loco. pf.. 106 - 107 1/2	Republic com... 51 1/2 - 53 1/2
Beth. Steel com. 58 1/2 - 60	Republic pf.... 82 - 84
Beth. Steel, Cl. B 62 1/2 - 65 1/2	Sloss com..... 39 1/2 - 41
Beth. Stl. 8 1/2 pf. 106 1/2 - 107 1/2	Un. Alloy Steel.. 26 1/2 - 27
Chic. Pneu. Tool. 65 1/2 - 67	U. S. Pipe com.. 24 1/2 - 26 1/2
Colorado Fuel... 26 1/2 - 27	U. S. Pipe pf.. 60 - 63 1/2
Cruc. Steel com. 60 1/2 - 62 1/2	U. S. Steel com. 88 1/2 - 91 3/4
Cruc. Steel pf.. 81 - 83	U. S. Steel pf.. 116 1/2 - 116 3/4
Gen. Electric... 146 - 151	Vanadium Steel.. 34 - 35 1/2
Gt. No. Ore Cert. 34 1/2 - 35 1/2	Va. I. C. & C... 50 - 53
Gulf States Steel 72 1/2 - 76 1/2	Westhouse Elec.. 52 1/2 - 55
Int. Har. com.. 84 1/2 - 85 1/2	

Annual Financial Statements

The report of the Thomas Iron Co., Hokendauqua, Pa., for 1921 shows a net loss for the year of \$69,536.50, this including the operation of its subsidiary, the Ironton Railroad Co. At the close of last year the inventories of pig iron and iron ore were marked down \$89,714.18 to present-day values. The company's total production of iron in 1921 was only 18,169 tons.

Earnings of the Pressed Steel Car Co. for 1921 were much lower than in the previous year. Last year's surplus totalled \$681,906, compared with a surplus of \$2,631,305 at the close of business in 1920. The 1921 earnings provide for \$5.45 a share on \$12,500,000 preferred stock, as compared with a 1920 surplus which not only took care of the preferred stock dividend but left \$13.25 a share for the common stock.

The Baldwin Locomotive Works earned net profits in 1921 amounting to \$5,044,096, equivalent, after payment of preferred dividends, to \$18.23 a share on the \$20,000,000 common stock, as compared with net profits of \$4,428,518, or \$15.14 a share, on the same amount of common stock in 1920.

Earnings of the Allis-Chalmers Mfg. Co. for 1921 show a net profit of \$2,215,467, equal to \$4.11 a share on the common stock after deducting preferred dividends. The 1920 net profits were \$3,564,248, or \$9.35 a share on the common stock.

The annual report of the American Can Co. for the year ended Dec. 31, 1921, shows net earnings of \$7,020,261, as compared with \$9,851,876 in the previous year. The surplus after preferred dividends of \$1,141,530 compares with \$1,944,587 in 1920.

The Continental Can Co., Inc., for 1921, reports a surplus after depreciation and federal taxes of \$811,004, equivalent after preferred dividends to \$3.75 a share on the outstanding \$13,500,000 common stock. In 1920 the company showed a surplus of \$1,548,620, or \$9.19 a share.

A special stockholders' meeting of the Walworth Mfg. Co., Boston, wrenches, fittings, etc., has been called for Feb. 27 to act on a proposed \$7,500,000 bond issue. The purpose of the proposed issue is to raise funds to retire outstanding bonded indebtedness and to provide additional working capital.

Stockholders of the Saco-Lowell Shops, Boston, textile machinery, have ratified the proposed increase of \$1,742,500 in the company's stock for the purpose of paying a 50 per cent dividend to common shareholders.

The Truscon Steel Co. last year, after charges, depreciation and dividends, showed a loss of \$336,000. The company wrote off \$980,000 on its inventory and plant depreciation. At the annual meeting President Kahn stated that business in January and so far in February was 30 per cent ahead of that for the corresponding period last year.

The Truscon Steel Co., Youngstown, Ohio, has declared the regular quarterly preferred dividend of \$1.75 per share, payable March 1 to stockholders of record Feb. 18.

The Composite Metal Lath Co., Hobart, Ind., has been declared bankrupt. The liabilities of the company are listed at \$117,219, while the assets are placed at \$46,448.

The Fred Medart Mfg. Co. has increased its capital stock from \$150,000 to \$750,000, of which 58 3/10 per cent is paid. The company has assets of \$1,053,936.21 and liabilities of \$380,962.41.

Study of Income Tax Returns

Washington, Feb. 21.—Statistical study of the economic data compiled from the returns of the net income of individuals, corporations and partnerships, for the calendar year ended Dec. 31, 1919, by the office of the Commission of Internal Revenue, reported to the Secretary of Treasury, was made public yesterday and reveals the large portion of total taxes paid by manufacturers of metal and metal products, including iron and steel makers and allied lines.

The figures also reveal, through deficits reported, the general slump in business for that year. The number of corporation income tax returns for 1919, other than those of personal service corporations, was 320,198, of which 209,634 reported net incomes amounting to \$9,411,418,458; income tax, \$743,535,888; war profits and excess profits taxes, \$1,431,805,690, making the total taxes \$2,175,341,578. For the calendar year 1918, the number was 317,579 of which 202,061 reported net income of \$8,361,511,249, and taxes aggregating \$3,158,764,422.

The number of individuals who filed income tax returns for 1919 amounted to 5,332,760. The total amount of net revenue reported by these returns was \$19,859,491,448, and the normal tax and surtax amounted to \$1,269,630,104. As compared with 1919, these figures show a growth of 907,646, in the number of returns filed, and an increase in the total net income reported amounting to \$3,934,852,093. Likewise, an increase of \$141,908,269 is noted in the total tax.

The total number of producers of metal and metal products reporting in 1919 was 13,118, of which 9,689, or 73.86 per cent, reported net incomes amounting to \$1,789,212,574. The gross income was \$12,616,661,680, and the total deductions aggregated \$10,827,449,106. The total number of corporations reporting was 67,852, of which 51,903, or 76.49 per cent, reported net income amounting to \$5,219,334,985. The gross income of all the manufacturing interests was \$45,704,873,968, with total deductions aggregating \$40,485,528,983.

It will be seen that the net income of producers of metal and metal products for the year was 30 per cent of the total for all manufacturers. The income tax paid by makers of metal and metal products was \$142,561,320, and the war profits and excess profits taxes \$314,690,478, making a total tax of \$457,251,798, which constituted 21.02 per cent of the distribution of the total taxes paid by all industrial groups, or 25.55 per cent of the total tax compared with the net income. The income tax paid by all manufacturing interests was \$414,891,763, and the war profits and excess profits tax aggregated \$944,306,603, making a total tax of \$1,359,198,366, or 62.48 per cent of the distribution of the total taxes paid by all industrial groups, or 26.04 per cent of the total tax as compared with the net income.

There were 3,429 producers of metal and metal products who reported deficits in 1919. This represented 26.14 per cent of the total number of producers of metal and metal products. The deficit reported aggregated \$119,834,070. The gross income of these manufacturers was \$897,478,703, while total deductions were \$1,017,312,773. The total number of manufacturers reporting deficits was 11,949, or 23.51 per

ment of all manufacturers. The aggregate deficit was \$266,745,738. Their gross income was \$6,548,702,815, while their total deductions amounted to \$6,951,448,548.

Showing the distribution of corporation income by industrial groups and by nature of deductions, the study of the Commissioner reports that including both those reporting net income and those reporting no net income, the total gross income of the 13,118 producers of metal and metal products was \$13,514,140,383. This cost of goods was \$9,044,525,883. The compensation of officers was \$203,724,391, the interest paid being \$122,444,338, while the domestic tax was \$126,560,917; exhaustion, amortization and depletion, \$334,825,764; miscellaneous expenses, \$2,012,677,586, total deductions, \$11,844,761,879; net income before deducting \$1,669,378,504, while the net income after deducting the taxes was \$1,212,126,711. The cost of goods or producers of metal and metal products was 66.93 per cent of the total gross income; the compensation of officers

1.51 per cent; interest paid 0.91 per cent; domestic tax, 0.94 per cent; exhaustion, amortization and depletion 2.48; miscellaneous expenses 14.88; total deductions 87.65; net income before deducting taxes 12.35; income tax, war profits and excess profits taxes, 3.38, and net income after deducting taxes 8.97.

The table shows that the net income of manufacturers of metal and metal products was 17.65 per cent of the invested capital of those paying taxes, while the total taxes was 25.55 per cent of the net income.

The 373 metal mining interests making returns in 1919 reported an invested capital of \$443,920,533, with a net income of \$72,192,392, on which an income tax of \$6,469,539 was paid, while the war profits and excess profit taxes amounted to \$2,690,155, making a total tax of \$9,159,694. Their total tax was 16.26 per cent of the invested capital and 12.69 per cent of the total net income.

UNEMPLOYMENT

Study Suggested by President's Conference — Kenyon Bills Have Rough Skidding

WASHINGTON, Feb. 21 — Study of the fundamentals of unemployment, and especially the methods for controlling the business cycle, was begun yesterday at a meeting at the Department of Commerce. A tentative plan drawn by Dr. Wesley C. Mitchell, of the National Bureau of Economic Research, was presented and a discussion of the subject was made. The meeting was addressed by Secretary of Commerce Hoover. Owen D. Young is chairman of the committee which has charge of the study. The meeting was inaugurated under the President's recent conference on unemployment, and its purpose is to illuminate the subject of cyclical unemployment.

Secretary Hoover is of the opinion that more information is necessary before the problem is solved, and indicated that until a more thorough understanding of the question is obtained, legislation on the subject is not timely. Because of this, the Administration is not disappointed at the failure of the Senate to pass the bill prepared and introduced by Senator Kenyon of Iowa to press public works during times of depression and to retard them during periods of industrial activity. After a two-day discussion, the bill was referred by the Senate last Thursday to the Committee on Education and Labor. This is considered to be equivalent to killing the measure for this season, at least.

Senators attacked the bill on the ground that it would give too much power to executive officials of the Government who would be empowered by the measure to control employment on public works by the method suggested.

Senator Sterling, of South Dakota, declared the bill was paternalistic in spirit and was supported by "big business." Senator Kenyon asserted that he had presented the bill chiefly in the interest of labor and that it had the endorsement of the American Federation of Labor, the Chamber of Commerce of the United States, and other organizations, and contended that it was a concrete result of the conference on unemployment and embodied principles recommended. In this connection, however, members of the conference feel that more information on the subject is necessary.

Senator Kenyon's bill to control the coal mining industry, details of which were explained in THE IRON AGE of Feb. 2, was also introduced last week and appears to have little support either in Congress or in Administration circles. Its passage at the present session, at least, does not appear at all likely. It had been hoped by Senator Kenyon, who has resigned from the Senate, effective Feb. 24, to become a judge of the United States Circuit Court, that the bill could be passed in time to set up the proposed coal mining board, so that the latter would be functioning, in an effort to prevent the threatened coal strike set for April 1.

To Prevent Jurisdictional Strikes

WASHINGTON, Feb. 21. — The Associated General Contractors of America, the American Institute of Architects, the Engineering Council, the National Building Trades Employers' Association, and the Building Trades Department of the American Federation of Labor through the National Board for Jurisdictional Awards which has just concluded its regular quarterly meeting in Washington, have reached a national agreement through a resolution heavily penalizing union workmen who refuse to abide by the decisions of the board.

The resolution provides that local building trades councils of union labor shall suspend unions and refuse to recognize or support those unions which refuse to abide by decisions of the National Board; it also provides that general contractors and sub-contractors who employ only union labor shall incorporate in their agreements with labor a provision that will secure compliance with all the decisions of the board and that they shall refuse employment to members of local unions which do not abide by such decisions and further that architects and engineers shall insert in all their specifications and contracts a clause that such decisions shall be followed.

This resolution is of far reaching consequence to settle those jurisdictional disputes, which have caused many strikes, with resulting delays and economic losses.

Flurry in Coal and Coke Markets

UNIONTOWN, PA., Feb. 20 — A flurry in both the coal and coke markets has been evident in the Connellsville region this week. This is attributable, in a measure, to the threatened strike in the union fields on April 1. Most observers, however, believe they see in the present situation an improvement which will be sustained and improved from month to month.

Several deals for furnace coke were closed this week for March requirements at \$3.25. A number of coal sales covering March requirements also have been made during the week. The Pittsburgh and Lake Erie Railroad has bought considerable coal during the week.

Frick Coke Co. operations in both coal and coke were strengthened this week.

Harry I. Worman, superintendent of motive power of the St. Louis & San Francisco Railroad, Springfield, Mo., has announced that the shops there will be leased to contractors and operated on a piece-work basis if the car workers reject the proposal to return to the piece-work basis.

A. E. Crockett, manager of the Bureau of Instruction of Jones & Laughlin Steel Co., Pittsburgh, gave an illustrated lecture on the manufacture of steel before the members of the Rotary Club of St. Louis on Feb. 22.

Machinery Markets and News of the Works

LULL IN INQUIRIES AND SALES

Market Spotty and Orders for Most Part Are for Single Tools

Otis Elevator Co. Issues List for Nine Machines and a Textile Interest a List for Ten

A lull in inquiry and sales is reported quite generally. In view of the hopes aroused by events of December and January, business so far this month has been disappointing. Orders are for the most part for single tools and competition is keen on each inquiry that appears. There is a fair degree of interest shown in used tools and in this connection it is reported from Cincinnati that used machines are coming into the market freely and at extremely low prices. A Massachusetts textile interest came into the market during the week with a list of 10 tools and miscellaneous equipment.

The Otis Elevator Co. has issued a list calling for four lathes of 14, 18 and 24-in. size; two drilling machines; two double-end grinders, and one cold cut-off saw.

Except for a revival of an old list of the Sewell Valley Railroad involving a 36-in. planer, a 250-ton wheel press, a 1200-ton steam drop hammer and a universal milling machine, no railroad inquiries have ap-

peared nor has any action been taken on pending lists.

During the week the Hammond, Ind., Board of Education awarded the list of tools reported last week to a local dealer in Chicago. The Kelly Valve Co., Muskegon, Mich., placed an order in the Chicago district for four No. 2 turret lathes and miscellaneous equipment. Part of the list recently issued by the H. B. Smith Co., Westfield, Mass., and involving a fairly heavy equipment, has been placed with a Worcester machine-tool builder.

Machine-tool builders in other districts are taking a hopeful view of the future. Although still far from active, machine shops in New England are showing more signs of life. Makers of road machinery are beginning to secure substantial orders and in the Pittsburgh district makers of steel mill equipment note better inquiry. In this connection it is reported that expenditures of a considerable sum for new equipment in one of the Pittsburgh district units of the Steel Corporation is under consideration. In Chicago the trade is encouraged by the opening of the new tractor works of the International Harvester Co. and the Milwaukee plant of that company is expected to resume in the near future.

The price situation remains substantially the same, the only change noted being a reduction averaging 15 per cent on hack saws by the Racine Tool & Machine Co. and a 25 per cent cut on turret lathes by the Warner & Swasey Co.

New York

NEW YORK, Feb. 21.

This month has been a great disappointment to those who expected that improvement in business, which was promised by events of December and January, has not materialized. Sales in this market for February will probably fall below those of the two preceding months. A large machine-tool company which keeps a chart of its sales reports that the curve was upward beginning in November and continuing to the end of January, but that the line will probably take a dip downward for February unless considerably more business should develop before the end of the month.

A fair degree of interest in used tools is shown by some buyers, but orders for new tools are at very low ebb and prospects are not numerous.

From the viewpoint of sales the crane market is dull, but there is an increasing number of inquiries pending. Few new inquiries are reported in the market this week. Russell, Burdall & Ward, Portchester, N. Y., are receiving quotations on a 2-ton transfer crane. The Wallingford Steel Co., Wallingford, Conn., reported to have purchased 10-ton and 3-ton overhead traveling cranes last week, placed this order with the Niles-Bement-Pond Co. The U. G. I. Contracting Co., Philadelphia, has purchased a 40-ton power house crane for Syracuse, N. Y., from the Niles-Bement-Pond Co. The L. B. Foster Co., Pittsburgh, Pa., has purchased a 20-ton, 50-ft. boom, used, Browning locomotive crane from Philip T. King, 30 Church Street, New York. The Milwaukee Electric Railroad & Light Co., Milwaukee, Wis., has purchased a 12½-ton, 15-ft. and 30-ft. boom locomotive crane from the Industrial Works. The electric tramway division of the Cleveland Crane & Engineering Co. recently sold a 2-ton, 1200-ft. tramway and 24 trolleys to the Hydro-United Tire Co., Pottstown, Pa., four 1-ton electric hoists for this installation being furnished by the Shepard Electric Crane & Hoist Co.

The Yonkers Electric Light & Power Co., 9 Manor Square, Yonkers, N. Y., has completed plans and will soon commence the erection of a new one-story power house on Columbus Avenue, estimated to cost about \$250,000, including equipment. Thomas E. Murray, 55 Duane Street, New York, is engineer.

The Columbia Ice Corporation, New York, care of Ophuls, Hill & McCreery, 112 West Forty-second Street, engineers, has completed plans for a two-story, reinforced-concrete ice manufacturing plant at Whitlock and Bryant avenues, estimated to cost about \$125,000, including machinery.

Seven electrically operated centrifugal pumps, electric motors and other equipment will be installed at the new pumping plant and filter station at the municipal waterworks, Newburgh, N. Y. Bids for the construction and equipment are being received up to March 20 by the city manager, W. Johnston McKay. George W. Fuller and James C. Harding, 170 Broadway, New York, are engineers.

The New York Edison Co., 130 East Fifteenth Street, New York, has completed plans for the erection of a new two-story power house at 33 Attorney Street, 25 x 100 ft., estimated to cost about \$75,000. William Whitehill, Sixth Avenue and Forty-first Street, is architect.

The George Haiss Mfg. Co., Canal Place, New York, manufacturer of coal-handling machinery, wagon loaders, etc., has filed plans for a new one-story building, 75 x 95 ft. It will be owned by the Haiss Realty Co., a subsidiary organization.

A vocational department will be installed in the new high school to be erected at Hornell, N. Y., estimated to cost about \$350,000, and for which bids will be asked early in March. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Witherbee Storage Battery Co., 613 West Forty-third Street, New York, will discontinue operations at its local plant, as well as at North Bergen, N. Y., and will concentrate production in its new works at Belleville, N. J., totaling about 30,000 sq. ft. of floor space. Machinery from the present plants will be used and additional equipment installed. The entire works will be used for electric battery manufacture.

The Board of Water Commissioners, Scarsdale, N. Y., will install three new centrifugal pumps, electrically operated, switchboard and other equipment at the municipal waterworks. Bids will be received until Feb. 27 for the machinery. The George A. Johnson Co., 150 Nassau Street, New York, are consulting engineers. George W. Field is clerk for the board.

William C. Hespe, Vienna, N. J., has acquired the local foundry of Daniel D. Wolfe, manufacturer of plows, castings, etc., and will remodel and improve the structure for the manufacture of stoves and ranges.

The U-Need Ice Co., Inc., 2150 Amsterdam Avenue, New York, has completed plans and will take bids for a two-story ice-manufacturing plant at Mt. Eden and Inwood Avenue, estimated to cost about \$75,000. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

The Parklap Construction Corporation, 84 Pine Street, New York, is planning for a new hydroelectric power plant at Diamond Creek, Ariz., estimated to cost about \$10,000,000, including transmission system and dam, 400 ft. high. It will

have an initial capacity of 150,000 hp. Parsons, Klapp, Brinkerhoff & Douglas, 84 Pine Street, New York, are engineers.

A vocational department will be installed in the three-story high school to be erected by the Board of Education, Jersey City, N. J., at Bergen and Bostwick avenues, estimated to cost \$800,000. Plans have been completed by John T. Rowland, Jr., architect, 100 Slip Avenue.

The Tidewater Oil Co., Constable Hook, Bayonne, N. J., will make additions in the tankage department at its refinery, including steel tanks, piping, etc., estimated to cost approximately \$275,000.

The Lock Joint Rifle Co., Cornelia Street and Albert Avenue, Newark, has filed plans for a number of shop buildings, including power house.

The County Board of School Estimate, Newark, has voted in favor of a bond issue of \$500,000 for the proposed vocational school at Bloomfield, N. J., and the proposition has been referred to the Board of Freeholders for approval. Preliminary plans for the school have been prepared by Guilbert & Betelle, 546 Broad Street, architects.

Anton Franz Mortel, Nurnberg, Germany, desires to get in touch with American manufacturers of machinery for making chalk in conical and square shapes for writing purposes.

The power house and other buildings at the plant of the Corlin Chemical Works, River Road, East Paterson, N. J., were destroyed by fire, Jan. 27, with loss estimated at about \$150,000, including equipment. Frederick Corlin is head.

Philadelphia

PHILADELPHIA, Feb. 20.

The Girard Cycle Stores, 1022 West Girard Avenue, Philadelphia, will take bids at once for a new two-story service and repair works, 50 x 66 ft., at Hutchinson and Thompson streets, estimated to cost about \$32,000. I. W. Levin, 1011 Chestnut Street, is architect.

Fire, Feb. 13, destroyed the main portion of the plant of the Ritter Can & Specialty Co., 1517-45 North Hutchinson Street, Philadelphia, manufacturer of cans, metal signs, etc., with loss estimated at about \$100,000, including equipment. William H. Ritter is president.

Freight-handling machinery, loading and unloading equipment, etc., will be installed by the Department of Wharves, Philadelphia, on the new piers at Wolf and Porter streets. Each of the piers will be 300 x 900 ft., and will cost in excess of \$2,000,000. Work has been commenced.

The Board of Trustees, Presbyterian Hospital, Thirtieth and Filbert streets, Philadelphia, will build a power house in connection with the new group of buildings to be erected at Saunders and Powelton avenues, estimated to cost about \$3,000,000, complete. Dr. H. G. Paul is president of the board.

A new one-story power house will be erected at the plant of the Bloch Go-Cart Co., 1136 North American Street. W. E. S. Dyer, Land Title Building, is engineer.

The United States Shipping Board Emergency Fleet Corporation, Bristol, Pa., has placed the local plant of the Merchants' Shipbuilding Corporation on the market, and all buildings, plant machinery, etc., will be sold within the next few months. The equipment to be disposed of includes 18 15-ton tower cranes, 9, 10 and 15-ton gantry cranes, and one 15-ton portal pier crane; also, power house complete, with turbo-generators, boilers, pumps, etc., and machine and tool shop equipment.

Martin H. Walrath, Philadelphia, operating a general millwork factory at Park and Glenwood streets, has taken bids for a new plant, including power house, at Sixteenth and Indiana streets. Eugene A. Stopper, 1507 Arch Street, is architect and engineer.

The Pierce, Butler & Pierce Mfg. Corporation, Broad and Race streets, Philadelphia, manufacturer of boilers and radiators, with plant at Syracuse, N. Y., has leased a portion of the two-story building to be erected at Oxford and Thirtieth streets by the Nelson Bedley Construction Co. for a local branch.

Fire, Feb. 14, destroyed a portion of the plant of the Berry Engineering Co., 610-28 Crosby Street, Chester, Pa., manufacturer of machinery and parts, with loss estimated at close to \$100,000.

The Standard Tank & Seat Co., 316 North Front Street, Camden, N. J., has awarded contract to Barclay, White & Co., 1713 Sansom Street, Philadelphia, for a new three-story plant, 32 x 78 ft., to cost close to \$30,000.

Sydney L. Wright, president New Jersey & Pennsylvania Traction Co., West Hanover Street, Trenton, N. J., and other officials of the company are organizing a company under the name of the Plumstead Township-Bucks County Electric Co., to operate a power plant and furnish light and power

service at Point Pleasant, Pa., and vicinity. Active operations will begin at an early date.

Arnold Orr, Slatington, Pa., formerly operating a machine and welding repair works at Plymouth, Pa., has acquired the Morgan property on McDowell Street, for the establishment of a similar plant. The building will be remodeled.

The Consumers' Auto Supply Co., 375 Bennett Street, Luzerne, Pa., has filed plans for a new one-story automobile service and repair building, 70 x 130 ft., on Main Street, estimated to cost about \$50,000. James Corgan is president.

The Board of Directors, Montgomery School, Wynnewood, Pa., has acquired the Hooper Estate property, totaling about 56 acres of land, as a site for a new school. An adjoining structure will be used for vocational work, to include machine and repair shop, electrical and other departments. Plans will be prepared at once by Arthur H. Brockie, 254 South Fifteenth Street, Philadelphia. Percy H. Clark is president of the school board.

The Superintendent of Public Grounds and Buildings, Capitol Building, Harrisburg, Pa., will receive bids until Mar. 11, for the installation of equipment at the power house for the new state highway garage building, Twelfth and State streets, comprising two 80-hp. return tubular boilers, with steel breechings and stack, vacuum pumps, blowers and auxiliary equipment. T. W. Templeton is superintendent.

The Harrisburg Taxicab Co., Harrisburg, Pa., will make extensions and improvements in its garage and repair works to double the present capacity, providing facilities for about 75 cars.

The Westmoreland Hospital, Greensburg, Pa., will build a new power house in connection with an addition to the institution. Edward L. Tilton, 141 East Forty-fifth Street, New York, is architect.

The coal reclaiming plant of the Milton Mfg. Co., Milton, Pa., manufacturer of nuts, etc., near Snyderstown, Pa., was partially destroyed by fire, Feb. 11, with loss estimated at about \$17,000. It will be rebuilt.

The Pennsylvania Power & Light Co., 802 Hamilton Street, Allentown, Pa., has arranged for a large increase in capital, the proceeds to be used for extensions and improvements to power plants and system. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Short Mountain Colliery Co., Lykens, Pa., has perfected plans for the immediate reconstruction of its pulverizing plant. New equipment will be installed. The McClintic-Marshall Co., Pottstown, Pa., has the construction contract.

A vocational department will be installed in the new three-story high school to be erected at Pottstown, Pa., J. H. Carey, secretary. Ritter & Shay, North American Building, Philadelphia, architects, have been commissioned to prepare plans.

The Triumph Motor Truck Co., Medina, N. Y., has completed plans for a new plant on property recently acquired at DuBois, Pa., and will commence work at an early date. Charles A. Melkle is president.

Vocational departments will be installed in connection with the three new junior high schools and one combination junior-senior high school to be erected by the Board of Education, Philadelphia. The structures are estimated to cost about \$3,225,000. Bids for two will be received in March, and for the other two at some time prior to June.

The Lansdale Foundry Co., Lansdale, Pa., manufacturer of gray iron castings, has added numerous improvements to its plant in the last four months and is again manufacturing a full line of calorific steam and hot water heaters.

The Inter-State Safety Appliance Co., Beech and Noble streets, Norristown, Pa., which was recently organized, will engage in manufacturing and jobbing of all kinds of safety devices. It will soon be in the market for foundry equipment, wood-working and stamping machinery.

George Shearman, Atlantic City, N. J., care of Haining & Pallister, Guarantee Trust Building, architects, will soon take bids for a one-story machine shop at Pennsylvania and Adriatic avenues, 36 x 70 ft.

Baltimore

BALTIMORE, Feb. 20.

The Continental Garage & Service Corporation, 715 Gaither Building, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a five-story service, repair and parts manufacturing plant, estimated to cost about \$250,000, including equipment. A complete machine shop will be installed. John C. Tolson heads the company.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until March 1, for jacks, drills, grinders and other machine tools for use at the Norfolk, Va., navy yard.

The **Central of Georgia Railway**, Savannah, Ga., is having plans prepared for a new coaling plant at Columbus, Ga. C. K. Lawrence is chief engineer.

Freight handling and conveying machinery, hoisting equipment, etc., will be installed on the new piers to be constructed by the Port Development Commission, Baltimore. A fund of \$10,000,000 has been arranged for the entire project, and the initial expenditure will approximate \$3,200,000.

The **American Balting Co.**, Baltimore, has acquired property at 1624-26 Bank Street, and will remodel the building for a new plant. M. C. Rasin is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Leesburg, Va., bids for which are being taken until March 8. G. R. Ragan, Terry Building, Roanoke, Va., is architect.

The **Southern Toy Co.**, Hickory, N. C., will take bids at once for a new plant at West Hickory, comprising three buildings, 40 x 100 ft., 40 x 50 ft., and 20 x 50 ft., respectively. A list of equipment is being arranged. G. F. Ivey is president.

A vocational department will be installed in the new two-story and basement high school to be erected at Roldville, N. C., estimated to cost about \$300,000. W. C. Northup, Winston-Salem, N. C., architect, will prepare plans.

The **Dublin Veneer Mill**, Dublin, Ga., is planning for the installation of new machinery to increase its capacity about 60 per cent. T. C. Alexander is head.

The **Town Council**, Dillon, S. C., is planning for extensions and improvements in the municipal electric light and power plant.

A vocational department will be installed in the new two-story and basement high school, 165 x 205 ft., to be erected at Gastonia, N. C., estimated to cost about \$300,000. White, Streeter & Chamberlain, Gastonia, are architects.

Chicago

CHICAGO, Feb. 20.

The local market is spotty, some dealers reporting practically no new business, while other houses have booked a number of fair sized orders. One local dealer was awarded most of the machine tools on a list just purchased by the Hammond, Ind., Board of Education. This inquiry was published in this column last week and the purchases just made amount to about \$15,000. Another order was placed locally by the Kelly Valve Co., Muskegon, Mich., which bought four No. 2 turret lathes and miscellaneous equipment. On the whole, current orders are for single machines and competition is exceedingly keen on each inquiry that appears. Purchases by industries are confined to the addition of a machine or two to round out present equipment. Large industries which have been important buyers in past years are notably absent from the market. The trade is encouraged, however, by the fact that the local tractor works of the International Harvester Co. started up with 1200 men last week after a long period of idleness. The Milwaukee tractor plant of that company is also expected to resume operations in the near future. No new railroad inquiries have appeared and action on the extensive lists pending has not been taken. New construction is confined largely to garages for which some equipment is being bought from time to time. No auction sales have been held recently, but the equipment of the Obenberger Drop Forge Co., Milwaukee, is to be sold soon to satisfy the claims of the creditors. This consists largely of forging equipment.

The price situation remains substantially the same, the only changes being a reduction on hack saws by the Racine Tool & Machine Co., averaging 15 per cent and a 25 per cent cut on turret lathes by the Warner & Swasey Co.

The crane market remains quiet, the only order reported being a 3½-ton motor-driven traveling overhead Shaw crane bought by the Tuthill Building Materials Co., Blue Island, Ill.

The **Damascus Steel Products Corporation**, 1500 Fourteenth Ave., Rockford, Ill., recently incorporated with \$50,000 capital stock to manufacture cutlery and small tools, has leased 6000 sq. ft. of floor space for manufacturing purposes and has purchased the following equipment to date: Three trip hammers, six grinding and polishing stands, one shaper, one engine lathe, two forges and three gas furnaces. The officers include C. F. Maitland, president; J. R. Hughes and A. T. Hayes, vice-presidents; C. P. Twomey, secretary, Jacob Aaron, treasurer, and H. M. Hanson, assistant treasurer.

The **Cabrango Mfg. Co.**, has increased its capital stock from \$350,000 to \$750,000 and will remove its plant from Mendota, Ill. to Granite City, where a site has been selected and buildings are now being erected at a cost of \$1,000,000. It is expected that the company will

make and prepare all parts in its new plant, which will include a foundry and an enameling department.

Ronneberg, Pierce & Hauber, architects, 10 South La Salle Street, Chicago, are receiving bids on a machine shop, 75 x 96 ft., at 2704-10 West Lake Street, for J. Nielsen. Cost \$20,000.

The **Briskin Mfg. Co.**, sheet metal manufacturer, 414 South Hoyne Avenue, Chicago, has let contract for a two-story factory, 50 x 127 ft., to cost \$40,000.

Ignatz Engel, 3056 Palmer Square, Chicago, is taking bids on a garage, 100 x 125 ft., at Milwaukee Avenue, near Crawford Avenue, to cost \$45,000.

E. T. Davis, 133 West Washington Street, Chicago, is taking bids on a one-story garage, 50 x 100 ft., at Wilmette, Ill., to cost \$20,000.

The **Hudson Motor Co.** of Illinois is taking bids through **Alfred S. Alschuler**, Chicago, on a three-story salesroom and service building, 100 x 300 ft., fronting on Michigan Avenue and extending back to Wabash Avenue, adjoining the Marmon building.

B. O. McDonald is equipping a machine shop in the rear room of the **Hancock Implement Co.** building, Tekamah, Neb., and will be prepared to do all kinds of automobile repair work.

Bids have been taken on a power plant for **St. Joseph's College**, Rensselaer, Ind. It will contain boiler room, machine shop, engine room, pump room, etc., and will be two stories, the first, 73 x 140 ft., and the second, 32 x 72 ft.

The **Lake City Utility Co.**, Lake City, Iowa, has been incorporated with \$40,000 capital stock to construct a light and power plant. H. D. Yelter is president.

The **F. P. Smith Wire & Iron Works**, 2346 Clybourn Avenue, Chicago, will break ground at once for the erection of a three-story, rear addition, 25 x 40 ft.

In connection with an appropriation of \$4,035,000 for the purchase of new rolling stock, improvements, etc., the **Penn. Marquette Railroad Co.**, South Wells and West Harrison streets, Chicago, will build a number of car and locomotive shops, estimated to cost approximately \$500,000, including equipment.

The **Denver Gas & Electric Light Co.**, Denver, Colo., has arranged for a bond issue of \$3,000,000, a portion of the proceeds to be used for power plant extensions and improvements.

The **Chicago, Burlington & Quincy Railroad Co.**, 547 West Jackson Boulevard, Chicago, has plans under way for the erection of a new electric power house at Broadway and Clark streets, Aurora, Ill., estimated to cost about \$100,000. **William T. Krausch**, 547 West Jackson Boulevard, is architect.

A vocational department will be installed in the new high school to be erected at Waseca, Minn., and for which **William B. Ittner**, architect, Board of Education Building, St. Louis, Mo., will prepare plans.

The **Speeder Machinery Co.**, Fairfield, Iowa, is considering preliminary plans for the erection of a new factory.

The **Illinois Traction Co.**, Champaign, Ill., is planning the erection of a new power plant at Decatur, Ill., estimated to cost about \$100,000, including equipment.

A new one-story power house will be erected by the **Roth Packing Co.**, Waterloo, Iowa. The installation will comprise two 500-hp. boiler and auxiliary operating machinery.

A vocational department will be installed in the new two-story high school to be erected at Clear Lake, Iowa, estimated to cost about \$150,000. **G. L. Lockhart**, 1853 University Avenue, St. Paul, Minn., is architect. *

New England

Boston, Feb. 20.

It is the consensus of opinion among local dealers that machine-tool sales in this district the past week were smaller than for any previous seven-day period this year. At the same time evidence suggesting better business later is noted. The **General Electric Co.**, West Lynn, Mass., has not, as was anticipated, closed on its list of 42 machine tools for special production work, nor on its list of other equipment, and the **Maine Central Railroad** failed to take expected action on the three large machines wanted. A Massachusetts textile interest came into the market the past week with a list of 25 miscellaneous tools. These and other inquiries bring the aggregate number under consideration by local dealers in to more than 100. It does not, however, include several inquiries for used machinery, developed this week, as prospective buyers' ideas of prices are too low to be taken seriously, but it does include a considerable number of used tools under negotiation.

Several New England cities contemplate the purchase of machine shop equipment, but only a few have begun to make up lists. The report that **Lowell and Quincy, Mass.**, are looking for equipment, according to information given

here, is incorrect. Both cities intend at some future date to pay, but lists have not been completed.

Local machine-tool dealers take a hopeful view of the future. Machine shops throughout New England are showing more signs of life, but are still far from active. Some of the largest industrial plants also are growing busier, which leads machinery dealers to believe equipment will be purchased sooner or later, especially by those having tools under consideration. A Westboro, Mass., machine tool builder has secured a contract for 15,000 large carburetors. Operations at other plants show little, if any, expansion. Makers of road machinery are beginning to secure some substantial orders.

Rules the past week include part of a list recently issued by the H. B. Smith Co., Westfield, Mass., heaters and radiators, and involve fairly heavy production equipment by a Worcester machine-tool builder, and a Boston representative of a builder closed on some half-dozen machines, subject to shipping instructions to be issued later. The Eastern Nail Co., Providence, bought a 16-in. used shaper, and a Brockton, Mass., manufacturer a similar tool. A local sheet metal concern closed on four power squaring shears, a Providence firm on a 15-in. x 6-ft. lathe, a Maine garage on two 9-in. x 4-ft. lathes, a Weirs, N. H., garage on a one-spindle drill, all new tools, and perhaps a half dozen other miscellaneous small tools have changed hands, most of them costing less than \$100 each.

In connection with greater activity among machine shops, larger sales of hand hoists are noted, business in such lines being more active than in months.

The Phillips Mfg. Co., overhead trolley equipment, will locate in Easthampton, Mass. It recently purchased three heavy shears and punches.

The property and equipment of the Winnisunnet Ship Yard, Inc., Chelsea, Mass., will be sold at public auction by J. E. Conant & Co., Lowell, Mass., on March 1, 2 and 3.

The Eastern Malleable Foundry Co., Naugatuck, Conn., is considering the erection of a one-story foundry, 50 x 250 ft., at Watervliet, N. Y.

Plans are being drawn for the Dennison Mfg. Co., Framingham, Mass., paper novelties, etc., for a four-story factory, 70 x 300 ft., in Southboro, Mass.

The Boston Elevated Railway Co. is having plans drawn for a one-story, 50 x 500 ft. shop to be erected at its Forest Hill station, Edward Dana, 108 Massachusetts Avenue, Boston, is general manager.

The Thompson-Copeland Co., Vine Street, Worcester, Mass., lock washers, steel cutters and screw machinery, has purchased the assets, including machinery, of the Worcester Nut Co., which will be removed to Vine Street.

The Victor Page Motors Corporation, New York City and Farmingdale, L. I., automobiles, will erect a manufacturing plant at Stamford, Conn.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for new coal-handling equipment to be installed at the Boston Navy Yard, and will call for bids at an early date. The work will be handled under specification 4583.

Superstructure erection of the new power house of the Cambridge Electric Light Co., 46 Blackstone Street, Cambridge, Mass., will be commenced at an early date. It will be 80 x 180 ft. and 40½ ft. high.

A vocational department will be installed in the new four-story high school, 145 x 180 ft., to be erected at Danbury, Conn., estimated to cost about \$150,000. Sunderland & Watson, Main Street, are architects.

A one-story power plant, 50 x 60 ft., will be erected by the Mason & Haulin Co., 492 Boylston Street, Boston, in connection with its new piano factory at Broadway and Third streets, Cambridge, Mass. Monks & Johnson, 99 Chauncey Street, Boston, are engineers.

A vocational department will be installed in the new three-story high school to be erected on Greenfield Street, Hartford, Conn., estimated to cost close to \$1,500,000. Bids will be asked at an early date. The F. I. Cooper Corporation, 38 Cornhill Street, Boston, is architect. W. H. Scoville is chairman of the school board.

The E. Howard Clock Co., Eastis Street, Roxbury, Mass., has purchased the three-story factory, 60 x 200 ft., of the Peabody Leather Co., Peabody, Mass., with power plant, and will remove its works to this location. Employment will be given to about 300.

The Amesbury Body Co., Amesbury, Mass., manufacturer of automobile bodies, has acquired a brick factory at Clark's pond, Amesbury, where it will remove its present works. New equipment will be installed.

The Director of State Institutions, Middlebury, Vt., has had plans prepared and will soon take bids for a one and two-story automobile service and repair building, 55 x 240 ft., at the State School for Feeble Minded, Brandon, Vt., estimated to cost about \$75,000. Lyman Austin, 240 College Street, Burlington, Vt., is architect.

Pittsburgh

PITTSBURGH, Feb. 20.

Business in machinery and tools is moderate in the extreme. Some of the small shops in this district are occasional buyers, but demands from the larger units are few and far between. A few fair-sized inquiries are before the trade. Some of the foundries which bid on the segments for the New York and New Jersey vehicular tunnel have made tentative inquiries for tools, but ordering them is contingent on their getting some of the segment business. The Sewell Valley Railroad, Rainelle, W. Va., has revived an old list and again is asking bids on a 36-in. planer, a 250-ton wheel press, a 1200-ton steam drop hammer and a universal milling machine. Little is going on in the crane market, but something should develop in the next few weeks in view of the many inquiries recently received. Steel mill equipment manufacturers note a better inquiry, and while current orders are few the impression prevails that better business is not far off. Expenditures of a considerable sum for new equipment in one of the Pittsburgh district units of the Steel Corporation is under consideration. This work was originally projected four or five years ago and now seems in a fair way of going ahead. The Allis-Chalmers Mfg. Co. recently took an order for three 24,000 bbl. oil pumps for the Gulf Refining Co. for installation at Port Arthur, Tex.

The Westinghouse Electric & Mfg. Co. reports a marked increase in the sale of large power apparatus this year. January sales reached a total value of \$1,500,000 in turbine generators and condensers. Some of the buyers were the Pennsylvania Edison Co., Easton, Pa.; Madison Gas & Electric Co., Madison, Wis., and the North Carolina Light & Power Co. Most of the business was included in ten units. Takata & Co., Japan, have ordered another large turbine generator for one of its new plants. Fifty steam auxiliary units were sold during the month for a wide range of application, many purchasers being industrial power plants.

J. C. Forster & Son, 2519 Penn Avenue, Pittsburgh, manufacturers of stamped ware, tin products, etc., have awarded contract to R. E. Murray, 310 Iron Exchange Building, for a new two-story and basement plant, 50 x 100 ft., estimated to cost about \$25,000. J. I. Forster is head.

Fire, Feb. 16, destroyed a portion of the plant of the Enterprise Foundry Co., Manhattan and Nixon streets, Northside, Pittsburgh, manufacturer of iron and steel castings, with loss estimated at about \$50,000, including equipment.

The Butler Bulk Co., Main Street, Butler, Pa., is completing plans for a new three-story automobile service and repair building, 85 x 110 ft., estimated to cost about \$150,000. The Hunting-Davis Co., Century Building, Pittsburgh, is architect.

The Citizens' Light & Power Co., Oil City, Pa., has arranged for a bond issue of \$43,000, for extensions and improvements in power plant and system.

Seobie & Parker, Pittsburgh, agricultural machinery, have leased the eight-story building, 30 x 120 ft., at 427 Liberty Avenue, for a five-year period, for its local works and headquarters.

The Negley Avenue Garage Co., Pittsburgh, has filed plans for a one-story service and repair building at South Negley Avenue and the Pennsylvania Railroad, estimated to cost about \$50,000.

The H. C. Frick Coke Co., Pittsburgh, is planning for the erection of a new coal tipple at its mines at Whitney, Pa. Work to commence early in the spring.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has rejected all bids for its four-story addition, 100 x 200 ft., and will call for new bids later. Bernard H. Prack, Keystone Building, Pittsburgh, is architect. The company has acquired about 1220 acres of coal properties in Stowe and West Deer Townships from the Monarch Fuel Co., for a consideration of \$733,000, and plans for extensive developments and operations on the land.

Fire, Feb. 12, destroyed the plant of the Blystone Mfg. Co., Cambridge Springs, Pa., manufacturer of machinery and parts, with loss estimated at about \$100,000, including equipment.

The Gilbert Water & Light Co., Gilbert, W. Va., recently organized, is planning for the erection of a local power house. J. A. Berry is treasurer and general manager.

The Mountain State Motor Car Co., McFarland Street, Charleston, W. Va., has preliminary plans under way for a new two-story service and repair works, estimated to cost about \$100,000, including equipment. A. D. Ellison is president.

A vocational department will be installed in the new high school to be erected by the East River District Board of Education, Princeton, W. Va., estimated to cost about \$130,000. Bids will be taken up to March 18. Wysong & Jones, Princeton, are architects.

The Bluefield Ice & Cold Storage Co., Bluefield, W. Va.,

will commence the immediate erection of a new ice-manufacturing plant at Bluefield Avenue and Poplar Street, estimated to cost about \$60,000.

The County Road Department, Clarksburg, W. Va., S. L. Coyle, County Road Engineer, will build a one-story automobile service and repair shop for county cars.

Milwaukee

MILWAUKEE, Feb. 20.

Machine-tool inquiry is becoming more active and sales more frequent, but the call is limited to one or two tools. Indications are that more business will open up before long and some foundries have received orders that justified taking on more men. The motor parts and accessory group is overcoming a temporary slowing up, although it is yet too early for automobile producers to know what to bank on in the spring selling season. The manufacture of trucks is making slow progress. That the outlook is growing more promising is indicated by the establishment of a number of new concerns in the metal-working industry.

The American Brass Co., since Feb. 1 under the ownership of the Anaconda Copper Co., has made public tentative plans for a considerable extension of production at the Western branch works in Kenosha, Wis. George H. Allen, formerly general manager at Kenosha, and now a vice-president of the company, spent the week in Kenosha to survey the works. It is planned to establish a new mill for drawing fine copper wire. This involves no new construction, as the mill will be installed in the former plant of the Kenosha Refrigerator Co., which was acquired by the American Brass Co. in 1916.

The Richards Iron Works, Manitowoc, Wis., has been converted into a corporation without change of name. The capital stock is \$125,000 and the incorporators are Henry and Reuben Richards and John W. Barnes. It does a general foundry and machine shop business and also is a fabricator of rolled steel products.

Cahill & Douglas, consulting engineers, 217 West Water Street, Milwaukee, are engaged in surveys contemplating the electrification of the power plant and factory drive of the Interior Woodwork Co., 521-529 Park Street, Milwaukee, and additional power plant and boiler house facilities for the Rhineland Paper Co., Rhineland, Wis.

The H. & D. Mfg. Co., Racine, Wis., has been incorporated with a capital stock of \$25,000, and will establish a plant for the production of pistons, piston rings and similar gas engine and automotive parts, accessories and specialties. The incorporators are Martin Horeth, William C. Draeger, Joseph F. Dodd, Walter R. Draeger and Charles Jenista, all of Racine.

Harry W. Bolens, president and general manager Gilson Mfg. Co., Port Washington, Wis., has purchased at public auction the plant, equipment and other property of the defunct Globe Metal Products Co., Sheboygan, Wis., for \$65,700. It consists of a gray iron foundry and machine shop. The Gilson company manufactures gas engines, implements, and farm tools and also does a large jobbing business in chair and furniture castings. Mr. Bolens expects to make a statement later relative to the use to which the former Globe works are to be put, and intimated that the production of a new type of power hoe and lawn mower tractor, recently developed at Port Washington, may be transferred to the newly acquired works.

The Wisconsin Electric Appliance Co., Menasha, Wis., has been organized with a capital stock of \$75,000 by Victor M. Gombert, G. E. Lewis and H. E. Ballard, all of Menasha. It will establish a factory for the manufacture of a general line of electric appliances and devices, but the incorporators are not ready to make details public.

The Norman Motor Car Co., Hurley, Wis., has plans for a two-story public garage and machine shop, 50 x 155 ft., estimated to cost \$30,000. Alvin J. Norman is president and manager.

The Milwaukee-Western Fuel Co., 120 Wisconsin Street, Milwaukee, sustained an estimated loss of \$150,000 by the destruction by fire of the anthracite coal shed at Canal Street and Sixth Avenue on Feb. 15. The building was 175 x 400 ft., and contained hoisting machinery and other equipment which is a total loss. It will be rebuilt immediately and inquiry is now being made for new equipment. William F. Ardern is vice-president and general superintendent.

The Board of Education, Durand, Wis., will take bids after March 15 for a new high school and vocational training institute, to cost about \$120,000. The architects are Oppenhamer & Obel, Wausau, Wis. H. H. Miles is secretary of the board.

The Borges-Baker Co., 551-563 Edison Street, Milwaukee, manufacturer of metal shears and similar metal-working devices, has incorporated with a capital stock of \$10,000. The owners are William F. and Arthur F. Borges and

Charles Baker, who also own and operate the W. R. Sherrin Co., doing automotive repair work, repainting, trimming, body construction, etc. The two plants occupy the same buildings.

The Board of Education, Whitehall, Wis., has plans by Oppenhamer & Obel, architects, Wausau, Wis., for a new combination high and industrial training school, 72 x 155 ft., two stories and basement, estimated to cost \$130,000, with school and shop equipment. A. D. Peterson, clerk of the board, will take bids about March 20.

The Tomah Iron Works, Tomah, Wis., which for some time past has conducted a public garage, machine and automotive repair shop in connection with its foundry and general machine shop business, has incorporated as the Tomah Iron Works Garage, Inc. The capital stock is \$30,000. The owners are Robert S. Murray, Carl A. Sweet and Harry M. Warren.

The Stoughton, Wis., works of the Moline Plow Co., has resumed the operation of its gray iron foundry for a limited period to turn out a number of orders for parts for new material as well as replacement parts. According to George Ford, general manager at Stoughton, it is impossible to predict if conditions will permit the continuance of production after present specifications have been filled.

Cincinnati

CINCINNATI, Feb. 20.

Local manufacturers report a slight falling off in inquiries and orders the past week. There are, however, still a few inquiries of some size being worked on. Orders booked were confined almost exclusively to single machines and while the past week showed a slight decline the general situation continues to improve and manufacturers in this district are confident that the industry is definitely on the upturn. Makers report difficulty in closing on inquiries and much shopping is being done by prospective purchasers in the hope of receiving substantial reductions in price. Very little success is being met with, however, but used machines are coming on the market more freely at very low prices.

The Breese Brothers Co., Cincinnati, metal manufacturer, has placed contract with the Fisher-Devore Construction Co. for the concrete work for its new building on Hunt Street, to replace the one destroyed by fire in December. Zettel & Rapp Mercantile Library Building, are the architects.

The National Protecto Pump Co., Dayton, Ohio, has purchased the plant formerly owned and occupied by the Dayton Metal Body Co., North Dayton, and will make alterations preparatory to moving its plant from its present location in West Dayton.

The Expression Player Piano Co., Columbus, Ohio, has purchased property near Dana Avenue and West Broad Street and is having plans prepared for a modern two-story factory, 48 x 210 ft. It will manufacture electric reproducing player piano actions. Charles E. Bard is president.

The Sterling Stove Co., Portsmouth, Ohio, has been incorporated with a capitalization of \$100,000 to manufacture gas cooking and heating stoves, with plant at Tenth and Scott streets. Henry Scott and E. W. Houkins head the company.

The Jones Machine Tool Co., Cincinnati, is in the market for a used No. 23 New Britain automatic machine, 2-in. capacity, for brass work.

Detroit

DETROIT, Feb. 20.

The Hirsch Mfg. Co., Sturgis, Mich., manufacturer of metal products, will soon take bids for a three-story and basement addition, 130 x 200 ft., estimated to cost about \$100,000. E. S. Patterson, 405 Hanselman Building, Kalamazoo, Mich., is architect. C. Hirsch is president.

A. O. LeGrande, Ferndale, Mich., operating a sheet metal works at 393 Woodland Avenue, is planning for the installation of additional equipment.

The Holley Carburetor Co., Vancouver Avenue, Detroit, manufacturer of carburetors and other ignition equipment, has awarded a contract to Culbertson & Kelly, 872 West Milwaukee Street, for the erection of a one and two-story plant addition at Vancouver and Military avenues.

The Consumers Power Co., Jackson, Mich., has plans nearing completion for a new two-story power house at Powers, Mich., estimated to cost about \$400,000, including equipment. It will replace a generating station recently destroyed by fire.

A one-story power plant will be constructed by the Michigan Canned Food Co., 817 Book Building, Detroit, in connection with its proposed new factory at Greenville, Mich., estimated to cost about \$150,000. The Industrial Construction Co., Eau Claire, Wis., is preparing plans.

A vocational department will be installed in the new high school to be erected by the board of education, Albion, Mich., estimated to cost about \$150,000. R. A. LeRoy, 102 Pratt Building, Kalamazoo, Mich., is architect. Donald Harrington is superintendent of schools.

A vocational department will be installed in the new East junior high school to be erected at Lansing, Mich., estimated to cost about \$150,000. J. N. Churchill, 514 Oakland Building, is architect. L. W. Cooper is secretary of the board.

The city of Battle Creek, Mich., will spend this year approximately \$50,000 for new equipment at the Verona water pumping station. It will include air lift pumps and engines.

Buffalo

BUFFALO, Feb. 20.

The Buffalo Chemical Fire Extinguisher Co., 67 Carroll Street, Buffalo, manufacturer of fire extinguishers and general fire-fighting equipment, has acquired about two acres of land at Central Avenue and the Erie Railroad as a site for a new plant, 160 x 300 ft., with two-story office building. This will comprise the first unit and will give employment to about 125. A second unit of like size will be built later. George H. Stephens is president.

The Niagara Power Co., Buffalo, will expend about \$11,000,000 for its new electric generating plant at Niagara Falls, N. Y., foundation and tunnel work for which has been commenced. A steel tower transmission line will be constructed to Buffalo. The plant will have an initial capacity of 200,000 hp.

A vocational department will be installed in the new high school to be erected at Medina, N. Y., estimated to cost about \$125,000. H. W. Robbins is chairman of the board. Plans have been prepared.

Fire, Feb. 13, destroyed a portion of the plant of the New Conklin Wagon Co., 420 East State Street, Olean, N. Y., with loss estimated at about \$300,000, including buildings and machinery. It is planned to rebuild.

Vocational departments will be installed in the two new junior high schools to be erected at Niagara Falls, N. Y., estimated to cost about \$1,000,000. Bids will be asked immediately.

The Clipper Tool Co., Buffalo, N. Y., has reduced its prices on clamp vises and oval slide vises, saw sets and machinists' hammers.

The Central South

St. Louis, Feb. 20.

J. M. Kurn, president St. Louis & San Francisco Railroad has announced that a 200-ton crane will be purchased for the company's main shops at Springfield, Mo., and that other equipment will be purchased at a total cost of \$205,000. No lists have been issued by the purchasing department.

The Columbian Steel Tank Co., Kansas City, Mo., has acquired property adjoining its plant for proposed extensions. A. A. Kraemer is head.

Fire, Feb. 8, destroyed the Dardanelle Machine Works plant, Dardanelle, Ark., with loss estimated at about \$13,000.

The City Council, St. Joseph, Mo., has called a special election, April 11, to vote bonds for \$500,000, for the construction of a municipal electric light and power plant.

J. M. Griffin, Laurel, Miss., and associates, have acquired about 25,000 acres of timber property in the vicinity of Hattiesburg, Miss., and plans the erection of a lumber mill, estimated to cost in excess of \$150,000, including machinery. It will have a capacity of over 50,000 ft. per day.

The Common Council, Charleston, Ark., has granted permission to E. G. Linley, Charleston, for the erection of an electric light and power plant for local service. Plans will be prepared at once.

Fire, Feb. 11, destroyed a portion of the plant of the Kentucky Veneer Mills, Louisville, with loss estimated at about \$75,000, including machinery.

W. E. Haarstick, Vandalia, Mo., and associates, are perfecting plans for the organization of a new company to construct and operate a plant at Jefferson City, Mo., for the manufacture of chains. It will be two stories and is estimated to cost about \$75,000.

The Baldwin Garage Co., Columbus, Kan., has plans under way for the erection of a new one-story service and repair works, 120 x 150 ft., estimated to cost about \$50,000.

A vocational department will be installed in the new three-story and basement junior high school, 110 x 124 ft., now being constructed by the Board of Education, El Reno, Okla., estimated to cost \$215,000.

The F. G. Allen Construction Co., 1442 Syndicate Truss

Building, St. Louis, is making inquiries for about 15,000 lb. of standard brass pipe, sizes 1/4 to 3 in.

The Crab Tree Corporation, Johnson City, Tenn., Frank R. Scott, president, is planning for the erection of a new grinding mill at its feldspar and mica properties in Mitchell County, N. C. A housing development for employees will also be built.

A vocational department will be installed in the new junior high school to be erected at Sapulpa, Okla., estimated to cost about \$100,000. Plans will be prepared at an early date.

The Common Council, McCracken, Kan., will take bids early in March for a new power plant and equipment. The Buckel Engineering Co., Hutchinson, Kan., is engineer. L. L. Ryan is city clerk.

D. C. Halo, Paducah, Ky., and associates, are organizing a company to construct and operate a crushing and grinding plant at properties in the vicinity of Bowling Green, Ky. About 1,000 acres has been acquired. The plant is estimated to cost about \$75,000.

The Kot N-Wood Products Co., Memphis, Tenn., will equip a portion of its new plant, now in course of erection, for the manufacture of disk wheels for automobiles. George B. Stryker is president.

Indiana

INDIANAPOLIS, Feb. 20.

The Haskell & Barker Car Co., Michigan City, Ind., has plans under way for a two-story addition to its shops to cost about \$150,000. Howard Shaw, 39 South State Street, Chicago, is architect.

The plant of the Buckeye Mfg. Co., Anderson, Ind., manufacturer of engines, has been sold by Luffield Myers, receiver, to James W. Sansberry, Anderson, and associates, for a consideration of \$15,100, including buildings and equipment. The property was appraised recently at \$170,000.

A power plant will be constructed by the Board of Trustees, Indiana Village for Epileptics, Newcastle, Ind., in connection with new institutional buildings on a site near the city.

Motors and other electrical equipment, ovens, etc., will be installed in the new four-story baking plant to be erected by the Craig Biscuit Co., 115 Montgomery Street, Fort Wayne, Ind., estimated to cost about \$150,000. The McCornick Co., Inc., 41 Park Row, New York, is architect and engineer.

A power plant will be installed in the new fifteen-story hotel to be erected by the Keenan Hotel Co., Fort Wayne, Ind., care of the Anthony Hotel, 128 West Berry Street, estimated to cost about \$900,000. C. R. Weatherhogg, Chizens' Trust Building, is architect.

Freight-handling and conveying machinery will be installed in the new seven-story and basement terminal warehouse, 195 x 245 ft., to be erected at Pennsylvania and Georgia streets, Indianapolis, by the Terminal Building Corporation, Albert E. Metz, president, Fletcher Savings & Trust Building, estimated to cost about \$250,000. Plans will be prepared at an early date.

R. O. Bright, president Arvac Mfg. Co., Anderson, Ind., announces the necessity of additional equipment owing to increased demand for its chief products, disk universal joints for automobiles. The manufacture of the company's original line, metal universal joints, will be continued.

The Gulf States

BIRMINGHAM, Feb. 20.

The Common Council, Altoona, Ala., is planning for the construction of a municipal electric light and power plant.

The Owens Boll Weevil Exterminator Co., Weatherford, Tex., is planning for the operation of a local plant to manufacture a special machine for boll weevil extermination in the cotton fields. J. P. Owens is president and general manager.

The Douglass Drilling Co., Rockdale, Tex., is completing plans for a new oil refinery with an initial daily output of about 50 bbl., to be increased later.

The Oklawaha Reclamation Farms, Leesburg, Fla., is planning for the construction and operation of a new hydro-electric generating plant in the vicinity of Moss Bluff, Fla. J. D. Young, Leesburg, is engineer.

The Board of City Commissioners, Vernon, Tex., is having plans prepared for the construction of a municipal electric light and power plant. It is expected to call for bids in the near future.

The McDowell Bell Building, Dallas, Tex., is

La., recently organized with a capital of \$250,000, is planning for the establishment of a local plant for the manufacture of oil well drilling and other tools. Wade E. Harrison is president and treasurer, and J. F. McDowell, secretary.

The Bedell Structural Steel Works, fabricator and erector, 3620 Boudin Street, New Orleans, is in the market for the following used equipment: Machine to shear $\frac{1}{4}$ -in. plates, punch $1\frac{1}{4}$ -in. holes, cut $\frac{1}{4}$ x 6 x 6-in. angles; compressor complete; drill press and screw cutter for machine bolts up to 2 in., also for threading pipe.

The Malone-Harrison Motor Co., Dothan, Ala., recently incorporated, has completed plans and will take bids at once for a new one-story service and repair building, 100 x 200 ft. J. V. Harrison, 118 North St. Andrews Street, is secretary and general manager.

The W. L. Lemly Foundry Co., Bessemer, Ala., manufacturer of cast iron pipe, is planning for enlargements in its local plant. It recently acquired the Columbus Foundry Co., Columbus, Ga.

James P. Owens, Weatherford, Tex., in co-operation with the Chamber of Commerce, Rockdale, Tex., is arranging for the erection of a new plant to manufacture special machinery to be used in connection with cotton plantation work.

The Miranda City Refining Co., Miranda City, Tex., has perfected plans for a new refinery to handle crude oil from the Laredo district.

The Miami-Cadillac Co., Miami, Fla., has awarded contract to P. J. Davis, Miami, for a one-story automobile service and repair works, 50 x 120 ft. J. E. Junkin is president.

The Switzer-Parke Co., 105 Paige Street, Houston, Tex., recently organized, has awarded contract to the H. H. Spaks Co., 1606 Bineham Street, for a new plant to manufacture electro-plated ware, enameled products, metal ware, etc. It will approximate about 11,000 sq. ft. of floor space, and the installation will include ovens, generators, motors, boilers and other equipment. Willard M. Parke is president, and Homer E. Switzer secretary and treasurer.

The Oklawaha Farms & Reclamation Co., Ocala, Fla., has preliminary plans under way for the construction of a new hydroelectric generating plant on the Oklawaha River.

The Texas & Pacific Railroad Co., Marshall, Tex., is completing the erection of a new three-story building on its local shop grounds, to be equipped for instruction and study in car and locomotive work for apprentices. Facilities will be provided for about 150 men and boys.

The Pacific Coast

SEATTLE, Feb. 14

The Mineral Metal & Hyproducts Co., American National Bank Building, San Francisco, has plans under way for the first unit of its new works at San Mateo, Cal., in property recently acquired, comprising about 1370 acres of tidelands.

The Power Implement Machine Works, Modesto, Cal., has acquired property on San Fernando Road, Glendale, Cal., 113 x 400 ft., as a site for a new plant to cost about \$25,000. J. J. Ferlin is president.

The James Graham Mfg. Co., Newark, Cal., manufacturer of stoves, ranges, etc., is planning the erection of a new reinforced-concrete factory to cost about \$50,000.

The City Council, Santa Ana, Cal., is planning for the installation of an electric power plant at the municipal waterworks, estimated to cost about \$75,000. Bonds in this amount will be arranged at an early date.

The Santa Fe Railway Co., Kerckhoff Building, Los Angeles, has awarded a contract to A. C. Fellows, Central Building, for its one-story machine shop at San Bernardino, Cal., 65 x 510 ft., estimated to cost about \$250,000, including machinery, cranes, etc.

The A. Meister Sons Co., Sacramento, Cal., manufacturer of automobile bodies, street car equipment, etc., is planning the erection of new works at Fresno, Cal., to cost about \$150,000, including machinery.

M. Elwane, 130 Montgomery Street, San Francisco, Cal., has awarded a contract to MacDonald & Kahn, San Francisco, for a new one-story machine shop at Fourth and Washington streets, Alameda, Cal.

The Los Angeles Automotive Co., Los Angeles, has awarded a contract to the Moran Co., Los Angeles, for a new one-story plant, 50 x 250 ft., for assembling electrically-operated automobile trucks and for parts manufacture.

The Wasserman Water Heater Mfg. Co., Burton Street, Los Angeles, has filed plans for an addition, 40 x 65 ft.

The International Mfg. Co., Long, Cal., recently organized

with a capital of \$200,000, to manufacture special turbine pumps, parts, etc., has selected a site for the erection of a new plant. Dean H. Thompson, president and general manager, is inventor of the pump.

The Kimball Motor Truck Co., 1265 American Avenue, Long Beach, Cal., will commence immediately erection of a plant at Spring Street and the line of the Pacific Electric Railway, Willowville section, to manufacture motor trucks. It will be one-story and approximate 24,000 sq. ft. of floor space. M. O. C. Hull is general manager.

The Northern Pacific Railway Co., Seattle, Wash., is considering the erection of new car and locomotive shops at South Tacoma, Wash., and extensions in local yard facilities, estimated to cost about \$350,000.

Cleveland

CLEVELAND, Feb. 20

Machine-tool dealers and manufacturers report a slight gain in orders and inquiries from week to week. Orders are almost wholly for single machines and come from widely scattered sources. The Otis Elevator Co., New York, has issued a list of nine machines for its Cleveland and Detroit plants, which is the only inquiry of any size that came out the past week. Manufacturers of automatic screw machines report an improvement in single tool orders and a better volume of inquiry. An order from Japan for a large turret lathe was placed with a Cleveland machine manufacturer during the week, which is the first Japanese order taken by this company in a year.

The Warner & Swasey Co., Cleveland, has announced a 75 per cent reduction on its line of turret lathes. This follows a 15 per cent cut made by the company last year.

The Otis Elevator Co. has issued the following list of machines all motor driven for its Cleveland and Detroit plants. One 14-in. geared head engine lathe, two 18-in. geared head engine lathes, one 24-in. geared head engine lathe, two $\frac{1}{2}$ -in. single spindle high speed drill presses; two double end dry grinders and one cold cut-off saw.

Canada

TORONTO, Feb. 20

During the past week a decided change for the better has appeared in the Canadian machine tool market. The automobile industry is the chief factor in the betterment of the demand and some dealers state that orders the past ten days have been much better than for any like period this year. In general, industrial activity throughout the Dominion has been making steady progress and both dealers and manufacturers are receiving orders from many unexpected sources. Municipalities which carried by-laws the first of the year for large expenditure on waterworks, sewage and electric plants are now making preparations to carry out these undertakings and are asking for information and ordering the required equipment. Renewed activity is reported in the mining fields of northern Ontario and dealers are receiving inquiries for equipment from this source. Improved manufacturing conditions is likewise having a good effect on the demand for small tools, practically all lines of which are moving in increased volume. Prices on machinery and small tools are showing a little more strength, and no announcement of any revision has been made during the week.

The Waterworks Commission, Brantford, Ont., is having plans prepared for an addition to the pumping station to cost \$250,000, including the installation of three gage centrifugal pumps with electric motors.

The City Council of Goderich, Ont., plans improvement to the waterworks system, including the erection and equipment of a new pump house to cost about \$50,000.

The town of Warton, Ont., plans the installation of electric pump and engine for the waterworks plant to cost \$10,000.

The International Burr Co., Watertown, N. Y., is establishing a manufacturing plant at Belleville, Ont.

Plans for hydroelectric development in the Calumet channel of the Ottawa River at Bryson, Que., have been deposited by the Ottawa & Hull Power & Mfg. Co. with the Minister of Public Works at Ottawa, Ont., and the Land Registry Office at Quebec, Que., disclosing the fact that the company is considering future expansion of its power development.

The Acme Pattern & Tool Co., Buffalo, N. Y., has leased the Thorpe factory on Courtwright Street, Bridgeburg, Ont., where it will establish a Canadian branch factory.

The city of St. Thomas, Ont., plans to install new transformers and equipment to cost \$25,000. Mr. Miller is engineer.

The York Sandstone Brick Co., East Toronto, is asking for prices on a horizontal return tubular boiler, 72 x 18, 450-lb. pressure, drum and tubes only.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.53c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.53c.
Hoops, base price	3.38c.
Rails, base price	3.13c.
Beams and channels, angles and tees	
6 in. x 1/2 in. and larger, base	2.63c.
Channels, angles and tees under 3 in. x	
1/2 in., base	2.53c.

Merchant Steel

	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	2.50c.
(Smooth finish, 1 to 2 1/2 x 1/2 in. and larger)	2.70c.
Tool-calk, 1/2 x 1/2 in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.55c. to 6c.
Shafting and Screw Stock:	
Rounds	3.45c.
Squares, flats and hex.	3.95c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

1/2 in. and heavier	2.63c.
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Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C R, One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	4.10c.
Nos. 22 and 24	3.60c. to 3.85c.	4.15c.
No. 26	3.65c. to 3.90c.	4.25c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	4.25c.
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 28	4.60c. to 4.85c.
No. 30	4.75c. to 5.00c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel

	Black	Galv.		Black	Galv.
1/2 in. Butt.	—56	—40	1/2 in. Butt.	—30	—13
3/4 in. Butt.	—61	—47	1 1/2 in. Butt.	—32	—15
1 in. Butt.	—63	—49	2 in. Lap.	—27	—10
1 1/2 in. Lap.	—60	—46	2 1/2 in. Lap.	—30	—15
2 in. Lap.	—56	—34	7-12 in. Lap.	—23	—7
3-12 in. Lap.	—55	—38			

Wrought Iron

Steel Wire

	Per Lb.
Bright basic	3.55c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.35c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

BASED PRICE* ON NO. 9 GAGE AND COARSE

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 1/4 c. to 17 1/2 c.
High brass wire	17 1/4 c. to 17 1/2 c.
Brass rod	14 1/4 c. to 14 1/2 c.
Brass tube, brazed	26 c. to 27 1/2 c.
Brass tube, seamless	18 1/4 c. to 19 c.
Copper tube, seamless	21 1/4 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21c. to 21 1/4 c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14-20	Primes Wasters
	IC.. \$10.00	\$8.50	80 lb...	\$6.05 \$5.80
	IX.. 11.25	10.00	90 lb...	6.15 5.90
	IXX.. 13.00	11.50	100 lb...	6.25 6.00
	IXXX.. 14.75	13.25	IC...	6.40 6.15
	IXXXX.. 16.25	15.00	IX...	7.40 7.15
			IXX...	8.40 8.15
			IXXX...	9.40 9.15
			IXXXX...	10.40 10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	83c.
Bar	85c. to 43c.

Copper

Lake ingot	15 c.
Electrolytic	14 1/4 c.
Casting	14 1/2 c.

Spelter and Sheet Zinc

Western spelter	6 1/2 c. to 7c.
Sheet zinc, No. 9 base, casks	10 1/4 c. open 11c.

Lead and Solder

American pig lead	5 1/2 c. to 6 1/4 c.
Bar lead	6 1/2 c. to 7 c.
Solder, 1/2 and 1/2 guaranteed	24c.
No. 1 solder	22c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	6c. to 6 1/4 c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	20c. to 28c.
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Old Metals

Prices are a little lower and business is difficult except at concessions. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	10.00
Copper, light and bottoms	8.00
Brass, heavy	5.25
Brass, light	4.50
Heavy machine composition	7.25
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	4.50
Lead, heavy	4.00
Lead, tin	3.50
Zinc	3.00

